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URINARY CALCULUS: SOME NOTES ON ITS HISTORY AND MODE OF FORMATION.¹

By E. S. J. KING,

Department of Pathology, University of Melbourne, Melbourne.

Just as old age is creeping on apace
And clouds come o'er the sunset of our day,
They kindly leave us, though not quite alone,
But in good company—the gout or stone.

—BYRON, *Don Juan*, Canto III, Stanza 59.

CALCULI, particularly of the urinary tract, have been better known than almost any other pathological condition, and accounts of their surgical treatment are to be found throughout the ages. It is natural that they should have been well known since, though there are many conditions these days which are well understood because large series of cases have been examined or a large amount of experimental work has been carried out on them, calculi produce definite and severe symptoms which demand attention, and, furthermore, they are in themselves something morphologically definite which can easily be correlated with the symptoms.

Many diseases cause considerable disturbance in the function of a structure or an organ, but after an attack has subsided or on the death of the patient there may not be anything definite to be seen. It is most satisfactory for a surgeon to be able to demonstrate some lesion (he always feels that he has achieved a great deal more when he has removed a large tumour than when he has dealt with some more apparently insignificant condition), and of

course this applies even more so to the patient who has suffered from the condition.

Not only are calculi, particularly the large ones, amongst the most striking of the various demonstrable abnormal structures, but in addition, and especially in the absence of modern methods of preservation of specimens, they are the most permanent kind of pathological condition. They are something of which the patient can be proud and which he can demonstrate to his relatives and friends; so we find that the condition is well known not only to students of medicine, but also to laymen who have no reason to have more than passing knowledge of the subject.

Nothing is said of calculus in ancient Egyptian writings, and even Herodotus does not mention it; however, an example of a vesical calculus was found in a predynastic Egyptian grave and a typical renal calculus in a mummy of the twenty-first dynasty.

Renal and vesical calculi were known to the Greeks. Hippocrates recognized the symptoms of calculus, and the reference to the operation of cutting for stone in the Hippocratic oath indicates that the condition was reasonably common and well known.

In Roman times the condition again was clearly well recognized. In the first century of the present era Celsus gave elaborate instructions for the performance of operation for the condition, so that it must have been common. A little later Galen described the symptoms clearly and recommended postural treatment for the pain and prescribed special drugs which were presumed to act as "solvents" of the calculi.

What has been written regarding the decline in medical knowledge and in surgical technique in the Dark Ages clearly indicates that the conditions which did require treatment must have been just as common as they had been previously, if not more so.

¹ Read at a meeting of the Urological Society of Australasia on February 25 to 28, 1952, at Melbourne.

Whatever the reasons for the decline of civilization in the Dark Ages, knowledge of medicine declined and almost disappeared in Europe. Christian intolerance and consequent persecutions resulted in the flight of the Nestorians to the East and provided the Arabs with translators for the Greek and Roman writings that they had been able to acquire. This was the beginning of the rise of Arabic medicine.

Stone was common in the Middle East, as it is today, and frequent accounts are to be found in the Arabian, Persian and Indian writings. The famous Persian and Arabic physician Abū 'Alī al-Husain ibn Sina (known to Europe as Avicenna) gave advice which is very like that of Hippocrates and Galen.

A story of interest to urologists deals with the calculus of Al-Nāsir, who was the thirty-fourth 'Abbāsid caliph. Al-Nāsir incidentally was the third-last caliph, probably because it was he who invited the Mongul chief Jenghiz Khan to attack the Shah of Khwārazm, with whom he had had a quarrel; the civilized world had reason to deplore his poor judgement. However, to return to his personal affairs, his physician was unable to give him any relief for the symptoms of the stone, but amongst various consultants who were called in there was a hitherto unknown Christian physician called Abū Nasr. For some reason that is not apparent, Abū Nasr, who was appointed physician in charge of the case, advised against operation and suggested medical treatment. On the third day the stone was passed and, of course, the young physician's fortune was made.

Since that time stone has continued to be one of the best known pathological conditions. It was referred to particularly by Guy de Chauliac, John of Gaddesden, Ambroise Paré, Pierre Franco and Cheselden, amongst other well-known medical writers; it was referred to by poets and writers such as Chaucer and Shakespeare down to Byron; and many well-known people have been known to suffer from the condition—for example, Horace Walpole, Sydenham, Louis XV and Pope Innocent XI. But the most interesting account is that of Samuel Pepys.

Samuel Pepys was successfully operated on ("cut for the stone") on March 26, 1658. He began his diary on January 1, 1659, and on March 26 each year he gives an account of the celebrations of the anniversary of what was a most important event in his life. He kept his stone, and on August 20, 1664, we find him "Up and to the office awhile . . . and so I forth to bespeak a case to be made to keep my stone in, which will cost me 25s.". On the twenty-seventh of the month he notes: "Thence to my casemaker for my stone case . . . it is well done and pleases me."

It is apparent that stone at this time was a most important condition and was well recognized by lay individuals. In John Evelyn's diary we find the note: "June 10th, 1669. I went this evening to London, to carry Mr. Pepys to my brother Richard, now exceedingly afflicted with the stone, who had been successfully cut, and carried the stone, as big as a tennis ball, to show him and encourage his resolution to go thro' the operation."

The condition appears to have been very common. Pepys gives an account of the illness of his mother, mentions that his brother John and his boy Tom Edwards have the stone and at various times refers to other people—Lord Southampton, Sir Thomas Adams and Alderman Pennington—as suffering from this complaint.

The interest that he takes in the condition is only an indication of what was generally thought about it and does not appear to be in any way morbid. He merely remarks the fact when he is told that his Aunt Jane has died of the stone. On March 27, 1668, he says: "This day, at noon, comes Mr. Pelling to me, and shews me the stone cut lately out of Sir Thomas Adams (the comely Alderman's) body, which is very large indeed, bigger I think than my fist, and weighs about twenty-five ounces."

But the quite remarkable medical knowledge possessed by laymen at this time is indicated by a letter sent by John Jackson, Pepys's nephew, to John Evelyn just after Pepys's death in 1703. "I must not omit acquainting you,

Sir, that upon opening his body (which the uncommonness of his case required of us, for our own satisfaction as well as the public good,) there was found in his left kidney a nest of no less than seven stones, of the most irregular figures your imagination can frame, and weighing together four ounces and a half, but all fast linked together, and adhering to his back; whereby they solve his having felt no greater pains upon motion, nor other of the ordinary symptoms of the stone."

Samuel Pepys provides a magnificent case history which deserves and indeed has received the closest attention. It would seem that Pepys had the common scepticism regarding the value of opinions of medical men, because he eagerly accepts any treatments suggested by his friends, such as Castile soap "in a posset", turpentine pills and horse-radish ale.

The condition appears now to be much less common. It is certainly less common in this country, and general knowledge is much less widespread than it was in the seventeenth century.

MODE OF FORMATION OF CALCULI.

The factors responsible for the formation of calculi are complex. It is all the more regrettable therefore that, although we have a considerable body of information regarding stone-formation, this is usually presented in a confused form. It is important that we should distinguish between physico-chemical and general clinical factors. Though these are interdependent it must be recognized that they are on different planes and should be considered separately.

There are two main kinds of calculi, which have been designed differently by different writers, but the appellations of primary and secondary, as given by Swift Joly (1929), seem to be thoroughly appropriate. A primary calculus is one which has no pre-formed nucleus and which is formed entirely of substances found in the urine of the individual; the secondary calculus is developed round a pre-formed nucleus and contains "foreign" colloid material. The primary calculus thus provides its own nucleus, and the development of this must be considered first.

Formation of the Primary Calculus.

Substances which are normally found in the urine may occur as crystalloids or as colloids. It is probable that many of them occur in both forms (Hammarsten, 1945). Most of the constituents of the urine are relatively insoluble and are found in the normal urine in concentrations of two or three times the maximum solubility in ordinary water. This is a complex matter, but is explicable in part by the occurrence of substances which are normally found as crystalloids, being in a colloidal form.

These supersaturated solutions or colloid suspensions must be in a state of unstable equilibrium. There is a definite surface tension at the junction of particles and water, and in view of the large number of particles this potential energy must be very considerable. The "least-energy principle" states that a system is in stable equilibrium only under those conditions for which its potential energy is at a minimum. Agglutination of particles diminishes the area of the surface and therefore diminishes the surface tension, and thus it brings the system towards a state of equilibrium. For this reason, in due time, agglutination of the tiny particles is likely to occur.

Agglutination of such particles in the form of demonstrable colloidal masses known as micelles has been demonstrated in the case of acetylsulphathiazole as well as calcium oxalate (Hammarsten, 1945). These micelles after a period become crystalline.

Changes of this kind may be observed in colloidal suspensions and even in solutions of crystalline substances when these are allowed to stand for some time (Schade, 1923), and the change is known as "ageing". A similar phenomenon is found within the body itself and is particularly well demonstrated in the cholesterol serous effusions in the pleura and pericardium (Moll and Fowweather, 1940). In these cases cholesterol precipitates

from some solutions which have the same amount and kind of cholesterol as others in which precipitation has not occurred; the phenomenon is observed in cases in which the solution has been present (stagnant) for some considerable time.

The important factors, therefore, are that the particular substances should be present in an appropriate, usually colloidal, form, and that they should have remained long enough in the region for "ageing" to have occurred.

Formation of Secondary Calculus.

A secondary calculus differs from that just described in that the precipitation of solid material occurs round a pre-formed nucleus. In so far as the beginnings of a primary calculus may constitute such a nucleus, the subsequent development—that is, increase in size of a calculus—of either type will depend on the same factors.

The nucleus of a calculus may be of various kinds. It may be the small beginnings of a primary calculus, or it may have various other forms, such as a clump of bacteria, some desquamated cells, a small mass of inspissated mucin, a small amount of fibrin, some pus or a foreign body. Any of these may form the nidus around which crystalline salts or colloidal material may be deposited.

Factors Determining Precipitation Round a Nucleus.

A calculus sometimes consists of a precipitate of almost a pure salt, but usually there is more than one and organic material is present in smaller or larger quantities. The amount of various substances may vary from time to time, thus giving the characteristic rings which can be seen on cross-section of the stone. It is necessary, just as it was in the formation of the primary calculus, to consider the various physical factors which determine the precipitation of salts and proteins as they occur in the test tube.

Solubility of Salt.—The normal solubility of a salt in water is, of course, a very important factor in determining its likelihood of being precipitated in a solid form in one of the cavities or tubes in the body. Even if the circumstances were so changed that a soluble salt would be precipitated, as soon as conditions reverted to normal it would probably go into solution again. However, there are other factors which must be taken into account as being complementary to this characteristic.

Amount of the Salt.—It is a common thing for relatively insoluble salts to be present in the urine, but in such small quantity that, even if some precipitation does occur, it will not result in the retention of this solid material within the body. This is well known in the case of oxaluria. However, the amount of salt may be increased in two ways. There may be a greatly increased excretion of it due to an increased ingestion of foodstuffs containing the material; this applies particularly to certain fruit and vegetables. On the other hand, there may be a relatively increased absorption of fluid from the tubules, that is, there is a concentration of the salt.

Condition of the Salt.—The condition of the salt also is closely related to the solubility of the salt. The salt may be present either as a crystalloid or as a colloid, and in the former case it may be in either molecular or ionic form and, depending on what form the salt is in, the solubility will alter considerably. This phenomenon is shown very clearly in cases of vesical obstruction with some infection. In these cases the urine becomes alkaline and an insoluble phosphate is precipitated (on an indwelling catheter, on a suture or even on some fibrin or other nucleus). If the urine is made acid this precipitation does not occur.

Presence of Other Salts.—The precipitation of one salt may be determined by the presence of others. This may be due to their possessing similar radicals or may be the result of the actual amount of material in solution or suspension. As mentioned earlier, a second salt may itself be precipitated and form a distinctive coating or layer on the calculus.

Presence of Proteins.—Proteins may affect the formation of a calculus in more than one way. First of all, they have a "protective action" on crystalloids—that is, they help to keep an amount of crystalloid in solution which is greater than that ordinarily found when the crystalloid is present by itself. As already mentioned, the amount of crystalloids in the urine is two or three times greater than is to be explained by simple solution, and this is one of the mechanisms by which this occurs. If the amount of protein is altered, or if protein should be precipitated by any means, then precipitation of the salt is likely to occur, and this will occur, of course, on the nucleus or small calculus already present. Proteins may be precipitated by the presence of salts in particular concentrations and also are influenced by the hydrogen ion concentration. Thus a protein in colloidal suspension will be precipitated at the dielectric point.

Changes in Hydrogen Ion Concentration.—Changes in pH may cause significant alterations in solutions and suspensions of salts and colloids in several ways. First of all, salts are sometimes less soluble at a particular range of acidity or alkalinity. This may be due to an alteration in the ionic state of the salt. Changes in pH sometimes result in changes in the salts themselves, as occurs with the phosphates, and these various salts differ considerably in their solubility. As has just been mentioned, alterations in pH may result in precipitation of proteins, which will themselves constitute some part of a calculus, but in addition this precipitation of protein will often have a secondary effect on salts which it has previously been "protecting". The general influence of changes in pH is well known and is demonstrated in the effect of acid-ash and alkali-ash diets. It is unnecessary to discuss these in detail; their influence on the formation of renal calculi has been appreciated for a considerable time. The influence of alkalinity of the urine in cases of bladder-obstruction has been mentioned above.

Stagnation of Solutions.—In every part of the body where fluid is being secreted or excreted, this is continuously being passed on—usually to the exterior, so that there is relatively little opportunity for the changes to occur which were described above in the formation of the primary calculus. However, sometimes there is interference with the forward passage of the solution and concentration of the salt and changes in the salts ("ageing"); thus the alterations which were seen to give rise to a nucleus may at a later stage also play some part in the formation of the layers of salts and colloid which are deposited.

Comment.—These various factors are such as may be demonstrated in the test tube and are the simplest form in which the changes which give rise to precipitation can be considered. It is unusual, however, in the animal body, for any one of these physico-chemical factors to act alone. Although it may happen, for example, in a case of metabolic disturbance in which an unusually large amount of some substance is produced (as in cystinuria), the general clinical conditions giving rise to calculus formation usually act by way of a combination of these.

Clinical Factors.

There are several general influences—metabolic, dietetic, climatic and infective—which are known to be related to and indeed causative of calculus formation. It is most important, however, that we should recognize that these are only general causes and must produce their effect by the action of the much more specific physico-chemical factors mentioned above. If we consider these clinical factors in some detail we can see that they can be explained in terms of the physico-chemical factors mentioned.

Metabolic Changes.—Metabolic changes may be observed in cases in which there is an increase in the amount of certain substances which are normally produced, such as cholesterol in the case of the gall-bladder and uric acid in the case of the urinary tract. It is more characteristically shown, however, in those cases in which calculi composed of cystine or xanthine are to be found. In these cases the nature of the underlying disturbances is not known. In other cases, however, the situation is much clearer. For

example, in some examples of parathyroid disease there is an increase of the amount of parathormone secreted, and as a result of this a great increase in the amount of phosphorus and calcium which is excreted by the kidney. This results in an excess of the salt, which is not very soluble, and so calculi are very likely to form. A more mundane example is that of the simple fracture. Here there is a disturbance of calcium metabolism, particularly if the patient is kept in bed, and as a result a renal calculus may form. However, as will be seen, other factors come into the matter here.

Diet.—The intake of food can have a very important effect on the constituents of the urine. Thus, for example, the amount of calcium oxalate in the urine may be determined entirely by the particular food taken. More important than the actual salts present is the change in the hydrogen ion concentration that may be produced by an appropriate diet. This is utilized clinically in the acid-ash and alkali-ash diets. The effect on the urine may be so great that not only may calculi form, but in appropriate circumstances small ones may actually redissolve. Vitamins, like hormones, may also play an important part in the production of calculi. Their action is complex; they may influence the kind and solubility of salts present; they may affect the lining of the tract in such a way as to produce nuclei on which calculi may form; and they make alterations of the motility of the organ involved so that stagnation of the part may occur. The importance of these factors is shown by the observation of the increase in occurrence of calculi when there is general lowering of nutrition—for example, after a war or during a famine from other cause.

Climate.—The part played by climate is well exemplified by the incidence of calculus formation in some tropical areas, particularly India, Egypt and the belt of countries adjoining these. There can be little doubt that the most important factor is a great increase in the amount of salt present in the urine, this being determined by the large amount of water lost from the skin owing to the hot atmosphere. At the same time it is probable that other factors, particularly dietetic ones, play their part in such circumstances. The importance of the factors mentioned is demonstrated by the satisfactory results obtained by ensuring a good quantity of urinary secretion (for example, by adding common salt to fluid intake).

Immobilization of the Patient.—In cases in which the patient has to remain in bed for some time, because of injury, some disease, such as tuberculosis of the spine, demanding continued bed rest or debility, it is well known that calculi may form in the kidneys. These are usually to be found in the lower calyx—an observation which is of particular importance when some degree of mobility of the patient is possible. When there is minimum movement there is likely to be stagnation in the calyces. If this occurs, there will soon be aging of the colloids and crystalloids present in the solution. That this occurs rapidly can be seen by the change which takes place in urine which has been standing in a test tube for even only twenty-four hours. Of course, in such cases of immobilization other factors, such as metabolic ones, which are associated with the condition giving rise to the necessity for the immobility, will play their part. The importance of some degree of movement of patients who are immobilized in one position has been shown by a diminution in the number of cases of calculi in series of these.

Obstruction to a Tube.—Immobilization of a patient gives rise to stagnation from a general cause, and in obstruction, for example, of the ureter or the mouth of a calyx, there will be stagnation from a local cause.

Infection.—Infection is a well-known cause of calculus formation, and when a calculus is already present it is well recognized that it will be responsible for a greatly increased precipitation on the surface of the calculus and therefore increase in its size. Infection produces its effects in a number of ways. In the first place, it will give rise to a nucleus, which may be a clump of organisms (which are perhaps responsible for the infection), desquamated cells, some pus or some inspissated mucin from epithelial

secretion. As a result of the bacterial activity there will be often a gross alteration in pH. There will usually be a considerable increase in the amount of protein in the fluid, and as a result of the pH change this may be precipitated. The alteration of pH will also cause considerable change in the crystalloids. These changes will become effective in the region of nuclei or of calculi which have already formed. It is unnecessary to emphasize the importance of infection in calculus formation. It is well known, and control of infection has been a cardinal mode of treatment in cases in which stone had formed or was likely to form. Recent adjuvants to control of infection have added significantly to our ability to deal with and prevent stone formation.

CONCLUSION.

The factors determining calculus formation are complex, but are made more apparently complicated by a failure to segregate clearly the general clinical from the specific physico-chemical phenomena. Thus we often find in a statement of causal factors, changes in pH, climate, concentration of salts and diet linked together as if they were comparable. This not only is in itself, but leads to, an unnecessary confusion of ideas. It becomes apparent that our problem here is one of semantics. It is not so much here a matter of words and their meaning as a matter of the indiscriminate mingling of ideas which are not comparable. All that is necessary is to keep apart two main levels of ideas: what can be reproduced in the test tubes and the general environmental factors which directly or indirectly give rise to these.

Problems of this kind are common today and attempts are being made by thinking people in all walks of life to overcome the unnecessary "failures of communication" which arise from carelessness in expression of ideas. It matters little whether a speaker is not clear or his audience does not comprehend. It is specially necessary in our profession, where so much is art rather than science, that we should make particular efforts to prevent confusion. In the case of calculus formation that we have been discussing it is essential to segregate unrelated levels of action. When this is done much of the apparent complexity is resolved.

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THE TREATMENT OF URETERIC CALCULI.¹

By G. R. DAVIDSON,
Ballarat.

THERE are two essential things to consider in the treatment of ureteral calculi: firstly, how may such calculi be prevented from getting into the ureter, and secondly, how and when should they be removed? As the majority of ureteral calculi reach the ureter from the kidney, it is obvious that prophylactic treatment must be directed toward the source of supply. It is well known that heredity, on occasions, plays an important role in urinary lithiasis, that chronic bone disease and recumbency are predisposing causes, and that dietetic deficiencies and preexisting pathological changes in the urinary tract also play their part.

When any or all of these factors exist, it is obvious that regular radiological examinations should be carried out and that deficiencies, anomalies and infections should be adequately dealt with.

¹ Read at a meeting of the Urological Society of Australasia on February 25 to 28, 1952, at Melbourne.

McCarthy (1950) advocates that a "scout" X-ray film should be a routine part of every physical examination, and mentions that there are "hard water" areas where everybody, public and the profession alike, should be especially alert. From a theoretical point of view this advice is, of course, excellent, but there are almost no limits to the number of investigations that can be advocated as being desirable in the course of a general overhaul. Unfortunately, as a rule, the economic factors are themselves limits to perfection in this direction. In passing, I wonder if McCarthy is correct in stressing, perhaps by implication, that "hard water" is such an important factor. Undoubtedly calcium is the substance that is found in the majority of renal calculi, in a greater or lesser degree, and an excess of it in the blood is considered a cause of lithiasis. As Winsbury-White (1950) points out, this is commonly due, paradoxically enough, to a deficiency of it in the food, in which circumstances the blood calcium comes in uncontrolled quantities from the bones. This matter is easily remedied by taking milk, in which calcium is presented in its most absorbable form. When hypercalcaemia is due to chronic renal disease it cannot be remedied by dietetic means.

Mention of hypercalcaemia raises the question of the relationship between hyperparathyroidism and urolithiasis. It seems that no finality has been reached in deciding how frequently this condition plays a primary part.

Beard and Goodyear (1950) claim that hyperparathyroidism is a significant cause of renal lithiasis and consider that it is the main aetiological factor in 5% to 10% of cases. In their opinion all cases of renal and ureteral calculi should be studied for the disease, despite the absence of any bone changes which can be demonstrated radiologically. The diagnosis is based on the presence of hypercalcaemia, hypophosphatemia and hypercalciuria.

Winsbury-White (1950) points out that although parathyroid disease admittedly occurs in association with lithiasis, some form of chronic renal disease is generally present as well, and it is by no means certain that the parathyroid derangement is always the initiating factor in the stone formation. Indeed it has been shown that chronic renal disease often causes an increase in weight of the parathyroids. He thinks that it is not unlikely that the kidney lesion initiates both the parathyroid changes and the lithiasis.

The truth probably lies somewhere between these very divergent opinions.

To summarize: the prophylactic treatment of ureteral calculi is obviously dependent on the prevention of renal lithiasis. It is quite obvious that no one single factor or common origin can explain the heterogeneous concretions that can form in the kidneys and be extruded so often into the ureters. If one such factor had to be singled out for pride of place, I am inclined to think that disease or abnormality of the urinary tract, so often apparently insignificant, might be well placed at the head of the list.

When a calculus enters a ureter, typical renal colic occurs in the vast majority of cases. Most of us still use morphine to relieve this pain, despite the fact that it has been regarded as a smooth muscle stimulant, causing contraction of the ureter with an increase in the peristalsis. J. Lapides (1948), in his interesting work on the physiology of the intact human ureter, claimed that he proved that this conception was erroneous. It is felt that his conclusions are worth quoting in their entirety. They are as follows:

It is postulated that tonus and rhythmic contraction of the intact human ureter are entirely independent of the central nervous system including the autonomic nervous system and all its ganglia.

The normal adequate stimulus for the initiation and maintenance of ureteral peristalsis is a stretching of the smooth muscle fibers of the ureter by the urine excreted from the kidney.

Peristaltic activity of the ureter can be altered by changes in urine volume output, within certain limits.

Rhythmic contractions and tonus of the intact human

ureter were not directly affected by administration of tetraethylammonium chloride, procaine high spinal anesthesia, doryl, epinephrine, prostigmine, atropine, traseantin, amethone, depropanex, calcium levulinate, nitroglycerine, amylnitrite, papaverine, perparin, lipolutin, pitressin, avertin (intra-ureterally), benadryl, demerol and morphine.

Demerol, pitressin and large doses of epinephrine produced a decrease in urine secretion.

Prostigmine acted as a diuretic in one-half of the patients to whom the drug had been administered.

No drug depressed ureteral peristalsis or decreased the tonus of the ureter.

Morphine does not produce increased peristalsis and tonicity of the ureter.

This subject is, of course, of very great importance. If these conclusions are correct (they were subject to some criticism by Trattner and Campbell-Begg in the discussion which followed the original paper), it does mean that morphine can be administered in cases of renal or ureteral colic without fear of causing increased spasm of the ureter. It also means that drugs acting on the sympathetic and parasympathetic systems, and in fact quite a number of other drugs, have no obvious effect on ureteral activity or spasm.

No record of these results having been confirmed or refuted can be found.

From the practical point of view I must admit I have not been impressed by the effect of any so-called antispasmodic drug in expediting the passage of a ureteral calculus. Other than passing a ureteral catheter past the calculus, I know of no better way of relieving the pain of ureteral colic than by administering adequate doses of morphine.

When a calculus is actually in the ureter, the problem arises as to how it should be removed and when. Compared with that of most of you, my own practical experience is not great. In the last two years I have dealt with 47 cases in which I have considered some form of interference advisable. Probably in that time twice that number of cases have been encountered in which the patients have had and have passed stones unaided.

Five stones were removed by ureterolithotomy and three by looped catheter; the others were passed after, because of, or in spite of, ureteral dilatations, catheterizations, ureteric meatotomy *et cetera*.

I have never had much luck with stone baskets and other extractors for stones in the lower part of the ureter; in fact I am rather frightened of them and, with the exception of the looped catheter in selected cases, now avoid them. My usual practice is to dilate the ureter with catheters of varying sizes, and if a catheter passes the stone I leave it there, if possible continuing the dilatation by passing one or more catheters up beside it. If a catheter passes the stone it is left there for sixteen to twenty-four hours before removal, a coverage of penicillin and streptomycin being given.

Ureteric meatotomy is carried out by using an ordinary wire stilette in a flute-ended catheter as an active cutting electrode. This seems to cut more clearly than most of the electrodes that are devised for the purpose. Incisions made by cystoscopic scissors, I think, produce a better end-result with less scarring. If it were not for the difficulty in keeping the blades sharp and for the annoying hæmorrhage that is often produced, I would use them for preference.

In an endeavour to ascertain the views of some of my colleagues about the management of ureteral calculi, I circularized 20 of the more senior members of this Association whom I felt I knew well enough to bother. These views, when summarized, might be regarded as representative of Australian urological opinion.

Operation is indicated under the following circumstances:

1. When a calculus is in the ureter of the only kidney.
2. In cases of bilateral ureteral calculi, unless they are very small and liable to pass quickly.

3. When the stone is large and unlikely to pass. Although everyone has seen large stones which have been passed into the bladder from a ureter, it is generally considered that calculi whose diameter is more than one centimetre require surgical removal.

4. In the presence of pyrexia and other symptoms of infection, repeated or continuous.

5. When frequent and repeated attacks of colic occur without progress of the calculus, either with or without evidence of back pressure.

6. When stones are present in the upper part of the ureter: (a) At the uretero-pelvic junction causing obstruction. This stone should be removed immediately. (b) In the middle of the ureter, above the pelvic brim. Unless the stone is a small one of regular contour, which can be expected to move on easily, early ureterolithotomy is considered in the long run to entail less morbidity than conservation. In general, high stones cause more obstruction than stones lower in the ureter.

7. In the presence of certain stones in the pelvic part of the ureter. This is the doubtful position. The decision depends on the size of the stone, the amount of stasis, the presence or absence of infection and the frequency and degree of pain. If the stone is large and the history is one of repeated attacks of colic without downward progress of the stone, ureterolithotomy should be organized without delay. In the absence of those factors, conservation can be persisted with for a very long time; in the case of the smaller stone, for months.

8. After failed manipulation. This generally means inability to pass anything beyond the calculus. It is usual to try at least twice.

9. In the presence of intercurrent disease or other condition which may place an additional burden on the kidney, already labouring—for example, pregnancy.

10. When a patient lives a long distance from a medical centre. This factor operates in Australia perhaps more than it does in most other parts of the world. It is obviously difficult to be ultraconservative when one's patient with colic lives some hundreds of miles away.

There is really no hard and fast rule as to how long it is safe to wait for a stone to pass. Probably the risk of permanent renal damage in a patient with a recent history is minimal.

Failure to pass the stone despite pain and failed manipulations are probably more certain indications for operation than potential or actual kidney damage. However, a time must come when some degree of renal damage becomes permanent, and the general consensus of opinion appears to be that if progressive renal deterioration is occurring with little or no movement of the stone, a period of six weeks should not be greatly exceeded before one intervenes surgically.

Conversely, when there is no infection of note, when the kidney function is reasonable and is not deteriorating rapidly, and when the stone is below the brim of the pelvis and is not too large, manipulation may be tried.

It is interesting to know if other stones have been passed previously.

Most of the correspondents appeared conservative in their attitude towards specialized extractors and preferred to use catheters, bougies or loops.

The desirability of a recently taken wet film accompanying a patient to the theatre before operation was stressed, and the fact that operations for the removal of stones from the lower end of ureters of fat plethoric individuals was a major procedure was also mentioned.

In conclusion, it might be asked if the future holds any promise of improvement in the methods I have described, which have been in vogue for years. Such possible advances could be considered, firstly under the heading of prevention and secondly under that of treatment. Higgins (1935) and Hammarsten (1938) have reported dissolution of rat calculi by change of diet, and C. W. Vermeulen (1951) and his associates have brought about a similar state of

affairs in rats by an alteration in urinary pH. They claim that these and other experiments suggest that under certain conditions the process of stone formation may be a reversible one.

A great deal of work is being done in an endeavour to find the perfect dissolving agent. We are familiar with solutions "G" and "M" and their limitations. Experimental work is being carried out with these solutions and others ("Calsol", for example), sometimes in combination with enzymes such as urease and wetting agents such as 1% "Tween 80" solution.

It seems perhaps unlikely that such dissolvents will be of great value as far as the treatment of ureteral calculi is concerned, because even if the perfect solution was discovered, at least two catheters would necessarily have to be passed beyond the calculus to allow for the introduction and drainage of the solution, and under these circumstances the calculus is likely to pass unaided.

From the mechanical point of view, McCarthy (1950) is experimenting with a flexible telescope with attached forceps. At open operation one sees just how tightly some of these calculi are impacted in the ureter, which often has to be incised over the stone before it can be liberated. I think that such an instrument would have a rather limited use and, except in very skilled hands, could be dangerous.

In this country few if any of us have at our disposal big mechanical or experimental laboratory resources. As practical urologists, perhaps the most helpful thing we can do is to train ourselves to recognize early, and treat adequately, often apparently insignificant degrees of urinary tract stasis, which is possibly the most important single factor in the production of urinary lithiasis.

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SOME ANATOMICAL AND PATHOLOGICAL CONSIDERATIONS IN PROSTATECTOMY.

By DOUGLAS B. DUFFY,
Melbourne.

I THOUGHT that in this paper I would indicate some of the anatomical details and pathological conditions of the prostate gland and try to show what bearing they have on the different operations of prostatectomy. You will be familiar with most of the facts that I am presenting, but they are facts which are of fundamental importance to us as urologists and hence cannot be stressed too often. With these facts in mind, I should like to make certain suggestions regarding their influence on the type of operation that is performed or on some details of technique in one or other method of prostatectomy.

Figure I gives a general view of the relations of the prostate, bladder and rectum and shows the arterial supply. This dissection was done by removing the left half of the pelvis and approaching the bladder and prostate from the

¹ Read at a meeting of the Urological Society of Australasia on February 25 to 28, 1952, at Melbourne.

left side, the peritoneum being left intact. The structures shown are the superior vesical artery from the obliterated umbilical artery, the inferior vesical group of arteries, the bladder, prostate, membranous urethra and external sphincter, and the rectum and peritoneum.

Firstly, let us consider the blood supply and venous drainage. The main arterial supply to the prostate is from the inferior vesical branch of the internal iliac artery. This artery is most frequently not a single branch but a

supply the external two-thirds together with the verumontanum. There is a fair anastomosis between these two groups of arteries.

When benign enlargement of the prostate occurs a striking change is seen in the distribution of the arterial supply. We know that most of these adenomata arise centrally, probably from the periurethral glands, and in doing so derive their blood supply from the arteries of that region—the urethral arteries.



FIGURE I.

group of three or four small arteries, as it is in this dissection. These arteries supply the base of the bladder, the lower part of the ureter, the prostate, the seminal vesicle and the *vas deferens*. The arterial supply of the prostate itself, as Flocks (1937) has shown, consists of two main groups of arteries.

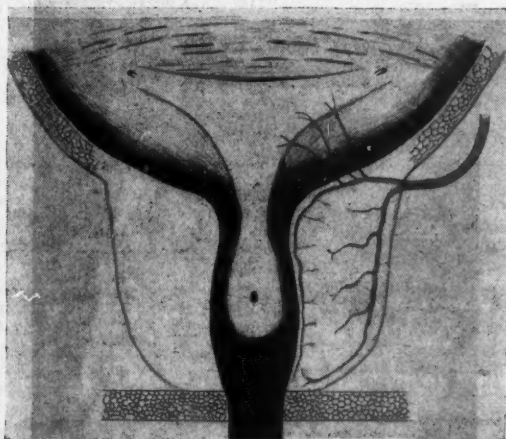


FIGURE II.

Figure II shows a urethral group which, entering the prostate at the vesico-prostatic junction in the postero-lateral region of the bladder neck, runs down close to the urethra and supplies the internal third of the normal gland except for the verumontanum.

The other group is the capsular group, which, running down on the capsule, sends branches radially inwards to

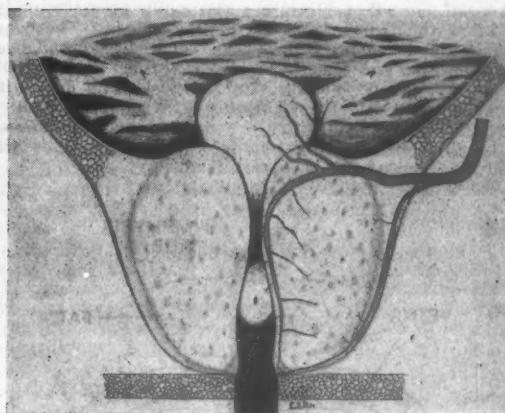


FIGURE III.

Thus the urethral group enlarges to supply the whole of the adenoma, whilst the capsular group is now confined to the rim of false capsule with an anastomosis which can supply only the outer shell of adenoma (Figure III).

These facts have several implications as regards prostatectomy.

Whatever type of prostatectomy is performed, the main arterial bleeding will be in the postero-lateral region of



FIGURE IV.

the bladder neck, and this is the region where haemostatic sutures should be placed in open prostatectomy and where the main arterial supply will be coagulated in transurethral resection. Early division of these will reduce the subsequent bleeding in transurethral resection, but their division without adequate removal of the adenoma which they supply will lead to post-operative sloughing, dirty urine, frequency of micturition and a generally poor result.

Veins.

The prostatic veins drain into the prostatic plexus, which is an extensive system of large veins located in the prostatic sheath of pelvic fascia. I am indebted to Mr. L. Murphy for the X-ray picture (Figure IV), which is an injected specimen of the prostatic plexus. The veins of the plexus generally run upwards and laterally, fanning out towards the base of the bladder and then back to join the internal iliac veins. There are many communicating veins, and the chief tributary of the plexus is the deep dorsal vein of the penis.

Those of you who perform any retropubic prostatectomies will know that these veins lie in two planes. There are those in the loose fatty tissue in front of the condensed fascial sheath, and those actually contained in, or lying beneath, the fascial sheath. It is important to deal with these veins correctly in performing a retropubic prostatectomy. The superficial veins are divided between forceps and coagulated. If you attempt to ligate them they will frequently tear, as they are very friable.

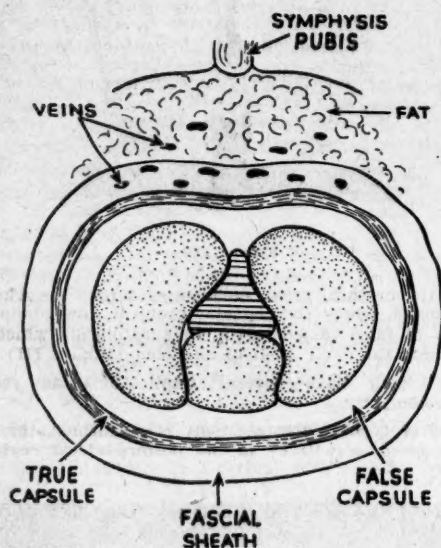


FIGURE V.

The deeper veins are largely controlled by transversely placed guy sutures, between which the capsule is incised. Attempted coagulation of these veins will produce too much necrosis of tissue. Any large veins still bleeding can be picked up and ligated individually. Theoretically, a vertical incision should cause less bleeding than a transverse incision; but there are many communicating veins and in fact the difference is negligible.

Another surgical problem associated with the veins is the intravascular haemolysis which may follow transurethral resection. This is most likely to occur if a venous sinus is perforated and large quantities of water are absorbed quickly into the blood-stream. I recently had a urethrogram taken of a paraplegic patient on whom two transurethral resections had been performed two and three years previously. Sodium iodide was used, and although little pressure was applied it showed immediate absorption into the prostatic veins outlining the prostatic plexus perfectly. This suggests to me that fairly large quantities of water may be absorbed during an ordinary transurethral resection, even when no large vein has been opened.

Next let us consider the capsule of the prostate. The normal prostate has a true fibro-muscular capsule which sends septa into the gland. Outside this is a tough condensation of pelvic fascia—the prostatic sheath—and in the

diagram we can see the relationship of it to the veins already referred to (Figure V).

When adenomata develop, they begin centrally and gradually compress the normal prostatic tissue into what



FIGURE VI.

is usually called the false capsule. The plane between the adenoma and the false capsule is the plane of enucleation in any open prostatectomy. In performing a retro-



FIGURE VII.

public prostatectomy it is not necessary or desirable to try to separate the intimately blended layers of the capsule. They are cut through as one layer, and it is much better to cut deeply into the adenoma when the plane of enuclea-

tion is easily seen than to make too superficial a cut and enter the wrong plane.

The name "false capsule" is a bad one, because, as you can see from Figure VI, it is anything but false. It is a thick, tough capsule which can be picked up and sewn with ease during a retropubic prostatectomy and which presents quite a solid barrier to perforation by our loops in resection.

Now a word about the external sphincter and verumontanum, as these are important landmarks in transurethral resection. In the normal prostate (Figure VII) you will see that the verumontanum does correspond fairly closely to the apex of the normal lateral lobes, which rest on the fascia over the external sphincter.

However, with the development of adenomata the prostatic urethra elongates and the apices of the lateral lobes are now considerably below the verumontanum (Figure VIII). Reed Nesbit states that he does not worry about the verumontanum, but just watches the external sphincter as he cuts, picking it up by a puckering of the

sphincter into the bladder unless there is concomitant middle-lobe enlargement. If only the lateral lobes are enlarged, they remain entirely subvesical, and as they increase in size the whole bladder base is elevated. This is one reason why I consider the retropubic operation the ideal operation for enlargement of this type. It is an extravescical approach to an entirely extravescical structure. Enucleation is easy, and visualization of the prostatic bed and bladder neck is ideal.

If a transvesical approach is used, the internal meatus is normal, and delivery of the lobes into the bladder after enucleation can be tedious. Visualization from the vesical sides is impossible unless a large wedge is cut in the posterior lip of the bladder neck. In resecting this type of enlargement your loop has a lot of scooping to do, and most traverses will be in the form of an arc of a circle. The bladder neck is peculiarly liable to perforation, as it is not protected by prostatic tissue at the internal meatus. You will note that the bladder and prostatic capsule join each other at an acute angle compared with that in trilobed enlargement. This trilobed enlargement is the other common type, and here all three lobes herniate through the internal sphincter into the bladder, leaving the internal meatus wide and patulous after enucleation. Approach and visualization in this type are good either transvesically or retropubically. If you are performing a resection in such circumstances the excursion of your loop is much straighter, and as the bladder neck is expanded perforation is less likely.

Conclusion.

I hope these observations have been of some interest to you. Although you may not agree with all my conclusions, they will serve to remind you, if any reminder is needed, of some of the problems of the surgery of the prostate.

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GRAM-NEGATIVE BACILLI IN URINARY INFECTION.¹

By E. W. KYLE,
Perth.

I FEEL very honoured that I have the opportunity today to address those who have been my guides and teachers in the past and who have always been so helpful to me.

Few of us present will disagree with me when I make the statement that, in spite of modern antibiotics, infection is still the most difficult problem which faces the urological surgeon. Possibly I would be on less sure grounds in making the statement that, in some instances, some of our problems have been aggravated by these very useful agents. Yet I believe that statement. To elaborate, I feel that with our old enemies, the lethal staphylococcus and streptococcus—in fact all the Gram-positive cocci—we have the upper hand, and we now do battle with them, much more confident in the ultimate result. How long this state of affairs will continue I would not care to dogmatize, for already resistant forms have been shown.

With the equally common, if less lethal, organisms, namely, the Gram-negative bacilli, I feel that while progress has undoubtedly been made, the control is proving much more elusive, and in some cases microorganisms previously regarded as harmless have shown that they can be extremely disturbing. In order to illustrate my points,

¹Read at a meeting of the Urological Society of Australasia on February 25 to 28, 1952, at Melbourne.



FIGURE VIII.

mucosa. This puckering can frequently be seen; but I think most of us like to have a look at the verumontanum now and then. Thus it remains a useful landmark so long as we realize that there will be a varying amount of adenomatous tissue distal to it, which can be recognized by its appearance, and which must be removed.

Finally, I should like to refresh your memories about Randall's work on the surgical pathology of prostatic enlargement and its implications as to prostatectomy. Firstly, the two types of middle lobe enlargement are as follows: (i) Posterior commissural enlargement—a heavy, solid lobe arising from the glands of the normal middle lobe. This may occur alone or in combination with lateral lobe enlargement, giving the horse-collar appearance. (ii) Subcervical lobe arising from the subcervical glands of Albarran. This may occur alone or in combination with lateral lobe enlargement. Only very rarely does it occur in combination with posterior commissural enlargement. (iii) Pure lateral lobe enlargement. (iv) The combinations already mentioned. (v) The rare subtrigonal lobe from Home's glands.

Pure lateral lobe enlargement is in my experience one of the commonest forms of prostatic enlargement. You will observe from Figures VI and VIII that lateral lobes, when they enlarge, do not protrude through the internal

I propose to discuss the progress of urological patients operated on in the Royal Perth Hospital, and have selected prostatectomy as providing the greatest numbers for study; though indeed my remarks apply to the whole urinary tract. For this purpose I have studied a group of patients treated prior to the last war and a similar group after it.

Prior to World War II the most successful method of prostatectomy in Perth was the two-stage Freyer method. The first stage was completed with a very large bore suprapubic drain tube, at least one inch in diameter. The drainage was therefore adequate, but, as you can imagine, the period of healing was very prolonged—an average of five to six weeks in good cases. The figures of results in those cases in which the patient actually came to prostatectomy were extremely good—about 4% mortality, which apparently compared very favourably with that in other parts of the world. The mortality in the very malperformed Harris procedure was very much higher—about 12%. You will note that I made the proviso "in which the patient actually came to prostatectomy". When I collected the figures, including those for patients who did not even have a first stage performed and those who died after the first stage, the mortality was about 28%—truly alarming it must have been to those approaching the sixth decade. Let me say in defence of the surgeon concerned—a very able man—that many of the patients travelled colossal distances and were moribund on arrival.

Now what has this to do with Gram-negative bacilli? Just this: an analysis of the cause of death showed that uræmia, shock, hæmorrhage and chest complications claimed most of the victims, and that infection, as shown by the temperature charts, played a very minor role. Further, the out-patient cards showed a surprisingly low incidence of chronic post-prostatectomy infection of a degree needing treatment.

In the post-war period under review the standard methods were resection, the Millin procedure, and the Harris procedure. A review of my own wards shows that 90% of the patients run temperatures of varying degrees at some stage, and a great number—I could not ascertain the exact figures—require treatment in the out-patient department for some form of urinary sepsis. In all the cases reviewed the infecting organism was one of several of the Gram-negative bacilli. Some patients were symptomless, but careful inquiry showed that some nocturnal dysuria still persisted, and some urgency. Now this was the main symptom for which many sought relief.

The Gram-negative infections on which I propose to elaborate today are the common ones met in urological practice, though indeed they are representative of the whole spectrum. Briefly—for I am a clinician, not a pathologist—I will refresh your memories on three groups: (i) The coliform group, (a) *Bacterium coli commune* and (b) its near relative *Bacterium aerogenes*. (ii) The *Pseudomonas* group, of which *Pseudomonas pyocyanea* is the outstanding member. (iii) The *Proteus* group, *Proteus vulgaris* being the main one of interest to us.

The Coliform Group.

The *Bacterium coli commune* is found almost universally in the intestinal tract of man and of the higher apes. It exhibits a wide variation in morphology. In size it varies from almost coccoid forms to large rods of about 7-0µ. Some varieties, particularly those found in chronically sick patients, are encapsulated—a point which may be of some importance. It is interesting that many found in cases of acute illness are β -hæmolytic. They are non-spore-forming, Gram-negative, variably motile by means of flagellæ, and easily grown in culture on nutrient gelatine and blood agar. They are facultative anaerobes. They are of only ordinary resistance to deleterious influences, such as heat and cold, but are more resistant to dyes than the Gram-positive organisms.

Their pathogenicity to man is very slight, the urinary tract being the most frequently invaded. Even here some subsidiary factor is necessary, as pure cultures may be injected into healthy, non-obstructed bladders with no

harmful results—a clinical fact, which most of us have noticed in the bacilluria of children; some trauma, sloughing from other infection or obstruction is necessary for them to become pathogens. *Bacterium aerogenes* is a very similar organism. It can be differentiated readily by the pathologist, but rarely by the clinician. One of the more important differences is that more forms are encapsulated and the organism is considerably more resistant to deleterious influences.

The *Pseudomonas* Group.

There are approximately 30 species of *pseudomonas*, but only one is pathogenic to man. It is an actively motile, non-spore-forming, variably sized organism, which produces a characteristic blue-green pigment; it is consistently aerobic and equally consistently resistant to deleterious influences. Its pathogenicity is interesting. For some time it has been regarded as a harmless saprophyte. Recent investigations have, however, shown that it is taking a greater part in a wide variety of suppurative infections in man, particularly in the urinary tract and in the central nervous system.

It is curious that when associated with the staphylococcus and streptococcus its pathogenicity is slight or non-existent. Its isolation in pure culture from severe cases of meningitis, pneumonia, cystitis and endocarditis has received increasing prominence in the literature. It is interesting to note that 0.25 millilitre of pure culture injected into the peritoneum of a guinea-pig is rapidly fatal. A similar injection of *Bacterium coli commune* produces but local pathological change or none at all.

The *Proteus* Group.

The third group, *Proteus*, usually described as the bacillus of putrefaction, is commonly found in the presence of decomposing matter, vegetable or animal. Again it is Gram-negative and non-spore-forming. It is a facultative aerobic, though poorly anaerobic.

Pathologically it is associated with a large variety of conditions, both as an accomplice and in pure culture. It is extraordinarily resistant to deleterious influences when in a suitable environment, for example, in dead tissue, but is readily eradicated from healthy tissues. Likewise its virulence is extremely variable, possibly varying with the local conditions. To us as urologists its ability to split urea is of great interest when considering the aetiology of stone.

The remaining Gram-negative organisms have no great interest to us, and it will serve the purpose of this discussion if I confine my remarks to those mentioned.

Means of Combating Infections.

I next propose to discuss means we have of combating these infections with particular reference to difficulties we have had in Perth. When reference is made to infected cases, only those patients showing tissue reaction in the form of pus cells in the urine are considered; bacilluria is considered physiological or due to errors in collection of specimens.

It was the custom to "cover" patients undergoing prostatectomy with full doses of penicillin and sulphonamide for thirty-six to thirty-eight hours prior to operation. For those who had sterile urine (about 20%) this régime was extraordinarily effective, the convalescence being rapid and the results good. In the infected group, however, things were different; most of these had very mixed infection of both Gram-positive and Gram-negative organisms, about one-third only being purely Gram-negative. It is the study of these two groups which has proved so interesting.

The first, or mixed, group after about seven days showed as a rule a complete absence of Gram-positive organisms; but the Gram-negative organisms had hardly been touched. Many of these patients showed clinical evidence of toxæmia in the form of persistent low-grade fever. The organisms present showed a considerable change. *Pseudomonas pyocyanea*, rare in the initial culture, was present in 40% of the cases. *Proteus* was equally common and the *Bac-*

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terium coli commune the least common, though it was the commonest pre-operative finding.

At the time these patients were treated the newer antibiotics, "Chloromycetin", aureomycin and terramycin, were difficult to obtain, and sensitivity tests were confined to penicillin, streptomycin and sulphonamides. Nearly all these infections were refractory to penicillin and sulphonamides, and after a few days' treatment nearly all were refractory to streptomycin except in impossible concentrations. The ill effects were mainly those of delayed convalescence. An analysis showed that only 1%—one patient—died as a result of these infections, but the delay was serious. In the end patients were discharged from hospital when afebrile, and subsequent follow-ups showed most of the infection persisting up to eight or ten weeks; by this time most of these elderly patients decided that the trip to the out-patient department was not worth while, and subsequent figures were valueless.

At this stage two cases of pyocyanus meningitis were reported from the neurosurgical clinic following air encephalography, which was performed in a room adjacent to the cystoscopy theatre. An investigation was undertaken to ascertain the source of this infection. As many spinal punctures had been performed by us during the same period in the same place with no untoward result, it was readily realized that the injection of air was the only possible loophole. This was shown to be accurate by air cultures producing good growth of *Pseudomonas pyocyanus*. It is notable that this was a period of hot dry weather with prevailing land winds. At that time, too, practically every journal from overseas was remarking on the increase in Gram-negative infections, and since all were using a prophylactic penicillin and sulphonamide cover we thought that this might be a common factor. The procedure was abandoned and these drugs were used only post-operatively when definite sensitivity was established. Results were immediately apparent, and our persistent Gram-negative infections diminished to about 10%, which to us has proved an irreducible minimum; the greatest reduction was the virtual elimination of *Pseudomonas pyocyanus*.

The advent of the free use of the newer antibiotics has proved disappointing in our hands. Most patients appeared to do well for a start, but practically all relapsed. In-vitro tests have shown that more organisms show sensitivity to "Chloromycetin" than to any of the other drugs, but in using them, while the severity of infections was undoubtedly diminished, I could not find one post-prostatectomy case in which the urine was rendered sterile by the use of this drug alone. In only one case, a resistant *Bacterium coli commune* infection, was there sensitivity to "Gantrisin"; and the result in this case was dramatic. Sterile urine was achieved in three days and remained for weeks.

We have found that aureomycin tends to nauseate these elderly people, and we did not persist with its use. We are at present using terramycin over a series of cases, but yet have not noticed any great difference.

Conclusion.

In conclusion: I have attempted to review a series of post-operative cases from the point of view of Gram-negative infection. I feel that the lesson learned is that the blind use of antibiotics, I mean without sensitivity tests, is both expensive and unjustified. In our hands it has produced evidence that the more resistant strains of bacteria may even be encouraged and their final elimination delayed. We are again forcibly reminded of the dictum that the use of antibiotics is no substitute for sound surgical principles, particularly those in our urological art of drainage and adequately nourished tissue.

I know that these principles are well known to you and I apologize to you for mentioning them. For my excuse, let me say that it is in the operations studied that those two principles are most often disregarded.

CHYLURIA.¹

By PETER ROW,
Brisbane.

CHYLURIA, as its name implies, means the presence of lymphatic chyle in urine. Chyle gives the urine a characteristic creamy appearance, which sometimes changes to pink or brick colour with the admixture of blood. The condition is not very common, but in Queensland at any rate it is by no means a rarity. Older practitioners tell us that it was seen much more frequently many years ago.

Chyluria is of particular interest to Queenslanders for two reasons. In the first place it is practically always a late complication of filariasis. Its continual presence thus serves to remind us that filaria is still endemic in some parts of our State. In the second place it was while practising in Brisbane that Dr. Joseph Bancroft first found the filarial worm in a lymphatic abscess in the year 1876. It was described by Cobbold a year later and given the name of *Filaria bancrofti*.

Filariasis.

Filariasis is a worm infestation widely distributed in tropical and subtropical regions, including coastal Queensland. According to Cumpston, it was probably introduced into Queensland by Chinese and Polynesian labourers during the middle of the last century. The disease is transmitted by mosquitoes, the common local vector being *Culex fatigans*.

The adult worms are quite sizable creatures and they inhabit lymph vessels. The female discharges her larvae into lymphatic channels, and thence they pass into the blood-stream, where they become "microfilariae". These are actively motile and they may be found in the peripheral blood-stream after 9 p.m., when the *Culex fatigans* is in search of prey. Such blood is imbibed by the night-biting mosquito. After changes within the body of the mosquito, larvae develop in about ten days and pass into the proboscis. While the mosquito is feeding they penetrate the victim's epidermis (the more easily if his skin is hot and moist) and eventually reach a lymphatic vessel, where they develop in six months into adult worms, thus completing the cycle.

The parasite which concerns us is *Wuchereria bancrofti*, formerly known as *Filaria bancrofti*. The disease filariasis varies with the locality, degree of infestation and particular "race" of the parasite concerned. Microfilariae usually cause no trouble, many persons with filaria infestation being quite unaware of it. During the stage of invasion and growth "filarial fever" may occur. The adult worm may block lymphatics and set up inflammation, the result being the occurrence of such complications as lymphangitis, lymphangiectasis, lymph scrotum, orchitis, elephantiasis and chyluria. These various manifestations of the disease differ according to the geographical locality and the "race" of the worm involved. The "typical race" of *Wuchereria bancrofti* is the variety found in Queensland. It is a relatively mild disease. Fever is uncommon and gross elephantiasis is quite rare. Its most frequent manifestations are chyluria, lymph varix, and lymph scrotum, all conditions familiar to the older Queensland practitioners.

In contrast the Polynesian race is non-periodic and transmitted by a different insect vector. It is also much more pathogenic than the "typical" race. Some of its complications may be quite awe-inspiring.

We are thankful indeed that we are reminded of the continual presence of filaria only by meeting an occasional chyluria and not by the rumble of wheelbarrows in our streets.

¹ Read at a meeting of the Urological Society of Australasia on February 25 to 28, 1952, at Melbourne.

Incidence of Filaria and Chyluria in Queensland.

The incidence of filaria infestation in Brisbane has declined during the last forty years. Croll in 1911 recorded infection rates of 5% in children and 11.5% in adults. The hookworm campaign in 1922 found 1.2% in children aged under five years and 4.3% to 5.5% in all other age groups. In 1938 Derrick found no infections in 228 adult patients in the Brisbane Hospital. However, Townsville in 1939 still had 3.1%, and a local endemic centre has remained at Goodna, near Brisbane, where Derrick found an infection rate of 6.7% in 1943. Thus, judging from these figures, we may expect to see cases of chyluria for some time yet.

A study of the records of the Brisbane Hospital reveals that during the thirteen years from 1938 to 1950, 52 patients were discharged with a final diagnosis of "filariasis" or "chyluria". Of these, 28 patients were shown without any doubt to have chyluria. Many of the others probably had chylous urine also, but specimens had not been submitted for laboratory examination. However, in none of these 28 patients suffering from definite chyluria was any evidence of active filaria infestation found. Over 50% of them had nocturnal blood smears examined, and in all of these the result was negative. Only two patients in the whole series had eosinophile cell counts over 5%. Microfilariae were not found in any of the specimens of chylous urine which were examined microscopically.

The ages of these patients ranged from fifteen to eighty years, and there were many more aged over fifty years than under fifty years. Of the 28 subjects with proven chyluria, 19 were males and 9 females.

However, chyluria is much more common than these figures suggest, since it is unusual for a patient suffering from chyluria to be admitted to hospital. For example, only three of those whose admissions were recorded were my patients; but I have an additional eight persons with chyluria who attend my out-patient clinic, and there have been several others whose records have been lost.

Relationship between Chyluria and Filariasis.

The primary cause of chyluria is believed to be lymphangiectasis resulting from filarial infestation and obstruction of abdominal lymph channels. Rupture of dilated lymph vessels into the urinary passages then follows.

While it is generally accepted that chyluria is a late complication of filariasis, this is not invariably so, as it may occasionally follow other lymph-obstructing diseases, such as neoplasm and tuberculosis.

It is interesting to note that in none of the Brisbane Hospital cases mentioned above was there any evidence of active filariasis. The microfilariae, worms and eosinophilia had disappeared. This corresponds with the experience of Shoyei Yamauchi, who studied the disease very closely and reported on 45 cases in Hawaii in 1945. Hawaii is apparently not a filaria-infested area. His patients had migrated from elsewhere, and he was thus able to show that many years usually elapsed before the onset of chyluria and by that time the filaria had generally died out. He also concluded that urinary tract obstructions, pelvic infections and pregnancy were often precipitating causes of chyluria. However, chyluria may occasionally complicate active filariasis. For example, in 1866 Wucherer discovered microfilariae in a specimen of chylous urine.

The site of the chylous fistula may vary. In text-books mention is made of rupture of a dilated lymph vessel into the bladder; but the possibility of chyle entering the collecting system of the kidney is seldom considered. In actual fact the latter is far more common. In every case of chyluria in which I have made a cystoscopic examination chyle has been seen spurting from a ureteric orifice. I have not yet seen a lymph fistula in the bladder. Also, in every case the chylous efflux has been predominantly unilateral, with one exception. Records of nine chyluric patients who have undergone cystoscopic examination several times show that the affected side has remained constant. Chyle emerged from the right ureteric orifice in four cases and from the left in four. The ninth patient had bilateral chylous effluxes. Although retrograde pyelo-

grams were prepared in all these cases and in a number of others also, only one pyelogram so far has revealed pyelolymphatic reflux and dilated lymph channels.

The Management of Chyluria.

The patient presents with a history of passing white urine. Such urine may be clear in the early morning, but it becomes white after breakfast, thus suggesting that intestinal chyle is responsible for its appearance. This state of affairs may persist with remissions for years. More often it is a case of haematochyluria. The urine is then brick red, tea-coloured, or grey and pink "like a galah", as one patient expressed it. There is seldom a history of filariasis, but the patient will have resided in Queensland or a Pacific island. Some patients have difficulty with micturition, as the urine "sets like a jelly". Urinary passages may be blocked by such gelatinous clots. In more severe cases there may be loss of weight and anaemia.

Examination of Urine.

A diagnosis is best made by inspection of the urine, when its appearance can hardly allow a mistake to be made. On examination by transmitted light it is translucent. Fat may be extracted by shaking the specimen with ether.

The creamy appearance of the urine is due to minute fat globules in a state of colloidal suspension. Such suspensions are remarkably stable. Specimens may be kept for many weeks without any alteration in their appearance. Even prolonged "centrifuging" will not clear such urine. However, if it is examined under the high power of the microscope with the illumination cut down, the minute fat globules are clearly visible and they exhibit Brownian movement. That there is a communication between intestinal lymphatics and the urinary passages may be demonstrated, it is said, by feeding the patient with unsaturated fat of high iodine value and showing that a rise in the iodine value of the urinary fat occurs; or 100 milligrammes of Sudan III may be administered in butter and the red colour noted in the urine or extracted from it with ether. I have had no experience of either of these methods of investigation.

Examination of the Patient.

A complete examination of the patient should be made in order to exclude other possible causes of chyluria, such as neoplastic disease or tuberculosis *et cetera*. A search is made for other evidence of filariasis, such as elephantiasis and lymph scroto. Nocturnal blood smears should be examined for microfilariae and a blood film for eosinophilia. Even in the absence of other evidence, chyluria may be assumed to result from filariasis, especially if the patient has lived in an area where the filaria is endemic.

Urological Investigation and Treatment.

Though urological investigation will follow the usual routine, it is on cystoscopic examination that most information is obtained; but this may be a failure if the patient has been starved beforehand. One should make sure that the patient has his usual meals or, better still, has a fatty meal a couple of hours before the cystoscopic examination. Any lymph clot should be washed out and the bladder wall inspected for lymph varices or lymph fistulae, which may be treated by coagulation with diathermy. The ureteric effluxes may then be examined. In almost every case an impressive spurt of milky white or pink urine will be noted from one ureteric orifice only. The affected ureter should then be catheterized, and after a preliminary X-ray examination to see that the catheter is correctly placed, retrograde pyelography is performed as a routine measure by the use of 12.5% sodium iodide solution.

This may occasionally reveal pyelolymphatic reflux and dilated abdominal lymph vessels; but usually it will be a normal pyelogram. However, in most cases the chyluria will cease within twenty-four hours of the pyelographic investigation. Such a remission may last for six months or even longer.

Should the chyle return, irrigation with sodium iodide can be repeated or a solution of silver nitrate may be substituted. At first we tried the method recommended by Shoyei Yamauchi. The patient is admitted to hospital and both ureters are catheterized, the catheters being left indwelling. Both sides are treated, even though the chyle appears to come from one ureter only. When the capacity of each renal pelvis has been estimated, one side is treated each day by the injection of sufficient 1% or 2% silver nitrate solution to fill the renal collecting system. The right and left sides are treated alternately, the catheters being maintained in position for several days. This treatment is reinforced by bed rest and avoidance of fatty foods in the patient's diet. We tried this technique in one or two early cases. The patients complained of loin pain and had such severe febrile reactions that the catheters were withdrawn.

Lately I have been irrigating the renal pelvis on the affected side only with 1% or 2% silver nitrate solution, in the out-patient department. Sufficient solution is injected to fill the renal pelvis. The injection is stopped when the estimated amount has been given or when the patient experiences loin pain. After a pause of two to five minutes as much silver nitrate as possible is removed from the catheter, which is then withdrawn. The cystoscope is then removed, a few ounces of water or saline being left in the bladder in order to dilute the remaining silver nitrate solution. The patient is instructed to empty his bladder in fifteen minutes' time.

I think that this technique is more effective than the usual retrograde pyelography with iodide solution, though there is not a great deal of difference.

The beneficial effect of such sclerosing solutions is probably due to a chemically induced pyelitis and lymphangitis, which seal the fistulous communications.

In addition to treatment with sclerosing solutions the patient will need as much rest as possible. His intake of fat should be reduced and his anaemia may need treatment.

Operative treatment, such as removal of dilated lymph channels or excision of granulomatous masses, may be indicated very rarely.

Four cases are presented to illustrate what may be expected. It is difficult to assess the results of treatment, as the disease is liable to spontaneous remissions. When symptoms are not severe, little more than reassurance and dietary restriction are required. In more severe cases with lymph clots and loss of weight, irrigation with sclerosing solutions is well worth while. In only one case encountered so far (Case IV) has the condition proved consistently resistant to such treatment.

Reports of Cases.

CASE I.—Mr. T.S., aged sixty-four years, sought advice on May 12, 1951, for recent frequency of micturition and the passing of "pink and grey" urine for several weeks. He was born in Brisbane and had lived within a mile of the Brisbane Hospital all his life. There was no evidence of active filaria infestation. His urine was sent to the laboratory and the diagnosis of chyluria was confirmed. On June 13 a cystoscopic examination was performed. The bladder wall was slightly trabeculated and he had early lateral lobe enlargement of the prostate gland; but both ureteric effluxes were clear. Indigo-carmin given by intravenous injection was returned from each ureter in five minutes.

Cystoscopic examination was repeated two weeks later after a fatty meal. This time there was a milky efflux from the right ureter. A catheter was passed to the right renal pelvis and iodide solution was injected. The retrograde pyelogram appeared normal. His urine became clear almost immediately, and it was still clear three months later. He has not been examined since.

CASE II.—Mr. A.W.G., aged fifty-eight years, was admitted to the Brisbane Hospital on November 3, 1948, with a history of having passed creamy urine intermittently during the past four years. He experienced great pain and difficulty with "lumps of jelly". His previous history did not suggest filariasis. No microfilariae were found in nocturnal blood smears. He was passing typical chylous urine.

When a cystoscopic examination was carried out on November 2, masses of gelatinous clots and "cobwebs" filled his bladder. The right ureteric efflux was milky-white and the left clear. His right ureter was catheterized and iodide solution was injected. A right retrograde pyelogram appeared normal, though shadows of gall-stones were visible. However, his urine remained milky white, so on November 11 another cystoscopic examination was carried out. This time both ureteric effluxes were clear (probably a result of starvation). The right ureter was again catheterized and 10 millilitres of 1% silver nitrate solution were injected along the catheter. Chyluria did not appear for two days, when it returned as strongly as ever.

A further cystoscopic examination was carried out on November 18 after a fatty meal. This time both ureteric effluxes were milky. Both ureters were catheterized and the catheters were left in-dwelling. Instructions were given to inject 12 millilitres of silver nitrate solution into one catheter each day, the sides alternating. The patient tolerated this treatment for two days, when he experienced so much pain and pyrexia that the catheters were removed. However, his urine was now clear. It was still clear when he was last examined sixteen months later.

CASE III.—Mr. R.B.H., a tram conductor, aged thirty-four years, had lived in Brisbane all his life, but served in the Pacific area during the war. He had been passing milky urine for six weeks when examined in June, 1947. He produced typical chylous urine with some clots. On June 12 a cystoscopic examination was carried out and a left milky efflux was observed. Left retrograde pyelography gave apparently normal findings, and the chyluria ceased immediately afterwards. One month later his urine became white again, but there were no clots. He still has intermittent chyluria, but it causes him little trouble and he has not been treated again.

CASE IV.—Mr. J.M., aged seventy-two years, was first examined on August 8, 1949. He had been passing urine like "milky tea" for several months and had difficulty with clots. He had always resided in Brisbane. There was no history of previous filaria infestation.

At endoscopic examination on August 11 he was found to have a trabeculated bladder, a large "adenomatous" prostate and a white efflux from his right ureter. Right retrograde pyelography gave normal results, and its effect was to stop the chyluria. His urine remained clear for five months, when the milkiness returned without the clots. He next developed acute retention of urine in May, 1950, and a suprapubic cystostomy was performed. There were no clots in his bladder at the time. Four weeks later his prostate was enucleated and he was discharged from hospital a month later with a good stream and urine still free from chyle. However, he soon returned with white urine and more clots. Between September 13 and October 11, 1950, he underwent cystoscopy four times in the out-patient department. On each occasion a milky efflux was noted on the right side. One more "retrograde pyelogram treatment" was given in addition to three treatments with silver nitrate solution. None of these treatments relieved his chyluria for more than a few days. When last examined on October 11, 1951, he still had chylous urine with occasional clots.

Summary.

1. Chyluria is not a rare disease in Queensland.
2. Though it is believed to be a late complication of filariasis it is unusual to find evidence of active filaria infestation in patients suffering from chyluria.
3. Chyle is discharged into the upper urinary tract much more commonly than into the bladder.
4. It is possible to relieve the symptoms of chyluria rapidly by filling the renal pelvis with sclerosing solution.

Acknowledgements.

I am indebted to Dr. M. J. Mackerras and Dr. E. H. Derrick for information about filariasis, and to Dr. A. Pye for permission to quote from the records of the Brisbane Hospital.

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SCARLET FEVER.

By W. M. KET,
Fairfield Hospital, Melbourne.

SINCE the work of Domagk (1935) on "Prontosil" many substances have been used in the treatment of illnesses due to haemolytic streptococci. Related sulphonamides have been widely used, but since the work of Florey (1940) on penicillin, streptococcal disease has commonly been treated with penicillin given by several methods.

The work of Jersild (1948) at Blegdam Hospital, Copenhagen, suggested that the use of penicillin would hasten the disappearance of streptococci from the throat and in uncomplicated cases allow patients to be discharged from hospital after eight days. Jersild (1950) has since published ancillary work.

Prior to the widespread use of chemotherapy, Scholes (1940) followed conventional practice in scarlet fever of insisting on bed rest for three weeks. His practice was to allow the patient to go home in the fourth week or afterwards, when he was well, and when discharges from infected areas were clear. With the increased use of sulphonamides for the original streptococcal lesion and for streptococcal lesions in hospital the period spent in hospital was reduced. Scholes in recent years at Fairfield Hospital had agreed with shortening the period of bed rest to fourteen days and with release of the patient from hospital between the eighteenth and twenty-second days, on condition that he was clinically well.

Following the work of Jersild we have continued to use penicillin and we have shortened the stay in hospital for scarlet fever. Like most hospitals, we had previously carried out trials of penicillin in several forms and by several routes.

Clinical Material.

This report covers clinical material consisting of all consecutive scarlet fever patients discharged from hospital between April 1, 1950, and March 31, 1951.

The criteria for classing a case as of scarlet fever are those commonly adopted in Australia. The following definition is based on the terms used by Wesley W. Spink (1947) and by Harries and Mitman (1951). Scarlet fever is an acute infectious disease due primarily to Group A β -haemolytic streptococci (*Streptococcus pyogenes*), which produce an erythrogenic exotoxin. The illness is characterized by local inflammatory reaction of the tissue, usually the throat, where the primary invasion by the bacteria occurs, and by enanthem and exanthem, fever, systemic disturbances and desquamation due to the dissemination of toxin by the streptococci in the local lesion. Scarlet fever is commonly streptococcal tonsillitis, associated or not with other manifestations, with enanthem—for example, glossitis—and with the occurrence or not of exanthem produced by the toxin, and typically followed by desquamation; the complications are caused by the toxin, by the invasion of the causal organism, or by both combined; classical complications are naso-pharyngitis, cervical adenitis, otitis media, nephritis, carditis, polyarthritis.

The total number of patients discharged from hospital in the considered period of twelve months was 404. In 303 cases *S. pyogenes* was isolated and cultivated from swabs taken on the patient's admission to hospital. There was also a group of 101 patients who were considered by the medical superintendent in consultation to be suffering from scarlet fever, although for various reasons *S. pyogenes* was not detected by bacteriological means. Sites of isolation of *S. pyogenes* were as follows: throat and nose, 301 cases; skin, one case; sputum, one case.

Methods of Treatment.

All patients were treated with penicillin. In 358 cases treatment consisted of intramuscular injections of procaine penicillin (one millilitre) given in the middle of the outer third of the thigh on the first, third and fifth days in hospital. Two days after the course of injections the

patient was allowed to sit out of bed, and check swabs of nose and throat were examined for *S. pyogenes*. A further course of penicillin was given if *S. pyogenes* was cultivated.

Penicillin was used in a preparation of procaine penicillin G 300,000 units-per millilitre with aluminium monostearate (2%) in arachis oil. The total dose for five days was 900,000 units of penicillin. Injectable material was obtained from the usual commercial sources of supply.

In a group of 46 patients penicillin was given orally by means of tablets at two-hourly intervals for five days, but periods of six hours without ingestion of tablets were allowed at night. Each tablet contained 50,000 units of penicillin. The total dose for five days was 6,000,000 units of penicillin. For the supply of tablets we are indebted to the Director of the Commonwealth Serum Laboratories, Parkville, and to Dr. P. L. Bazeley.

Antitoxin was given when patients appeared to suffer severe toxæmia in the presence of an erythematous rash. The dose of antitoxin used was 3000 units given intramuscularly. There were 17 patients who received antitoxin as well as penicillin.

Results.

After the initial course of penicillin and rest two patients received a further course of penicillin because check examination of swabs showed *S. pyogenes* in culture; nine patients received penicillin on clinical grounds. The average duration of stay in hospital of all patients in our series was ten days.

The sequelæ observed in hospital are shown in Table I.

TABLE I.

Sequelæ of Scarlet Fever.	Occurrence in 404 Patients Discharged from Hospital April 1, 1950, to March 31, 1951.		
	In Hospital.	At Home.	Total.
The carrier state (<i>S. pyogenes</i>) after seven days	2	—	2
Naso-pharyngitis and tonsillitis	2	17	19
Cervical lymphadenitis	—	11	11
Otitis media (non-suppurative)	2	4	6
Otitis media (suppurative)	4	5	9
Arthralgia and myalgia requiring bed rest	3	2	5
Carditis	1	—	1
Nephritis	—	1	1
Hæmatoma of thigh requiring management	6	—	6
Urticaria	4	—	4

Upon release of the patient from hospital a follow-up at home was undertaken, ranging from three weeks to several months; most of the information obtained in reply to questioning reflects the condition of the patients in the period of six weeks after they had left hospital. In the time under consideration there were no deaths and no readmissions for sequelæ, although examination of the sequelæ at home shows that a few patients could have been admitted to hospital with good reason. Sequelæ observed at home are shown in Table I.

A generation ago the sequelæ in hospital of scarlet fever could be severe; figures published by Scholes (1926) are shown in Table II. These figures and the figures of age incidence shown in Table III should be taken as a matter of interest rather than of controlled comparison.

In the year considered by us it may be seen that scarlet fever affected many children aged under five years. Tonsillitis and naso-pharyngitis accounted for most of the primary lesions. Of the sequelæ in hospital, otitis media is important. It is disturbing to find cases of otitis media occurring later at home. Fortunately, the private practitioner is able to produce good results in most cases of otitis by rapid treatment with penicillin, other antibiotics or sulphonamides.

Discussion.

The figures for the sequelæ of carditis and nephritis in 1951 are low; the reasons are not obvious. Figures for carditis and nephritis probably reflect early and intermediate stages of sensitization phenomena. We have had personal communications showing that approximately a

worth watching—namely, the existence (apart from other foreign proteins) of cryptic minute organisms as sensitizing agents in some rheumatic and collagen diseases (for example, pleuropneumonia-like organisms considered by Brown, 1951), and the use of cortisone in sensitivity states reported by various workers.

Therapeutic Comment.

The advantages of giving few injections are obvious. The disadvantages of giving any injections at home are factors in deciding whether scarlet fever patients should be sent to hospital. In suburban areas, under good conditions, the visiting nurse or physician can manage these patients if the physician desires to care for them at home.

Hæmatomata of the thigh occur when the injections are given superficially; they are not so painful as septic areas due to injections of some other materials. When the injections are given deep into muscle tissue, they are absorbed satisfactorily and hæmatomata subside easily. It is likely that excessive limb movement promotes too rapid absorption of antibiotic; but this is not an important consideration when patients are kept in bed in hospital.

The occurrence of urticaria due to penicillin or to the vehicle is unpredictable, but the overall incidence is low. The figures quoted can give no indication of sensitization to later treatment with penicillin. It is possible that the incidence of urticaria would rise with further injections.

It is the opinion of some specialists and consultants in communicable diseases that a régime of penicillin should currently fall within the following ranges: daily intake of penicillin, between 300,000 and 1,200,000 units, depending on the vehicle, the route and the frequency of administration; length of treatment for one course, between five and eight days. The use of convalescent serum or antitoxin would be additionally desirable for severe infections. Failure of *S. pyogenes* to grow in culture from swabs taken on the third day after a course is probably sufficient indication that the patient is free of *S. pyogenes* for public health purposes. Growth of *S. pyogenes* after two full courses suggests the need of another antibiotic (such as aureomycin, chloramphenicol or terramycin) if urgent or intensive treatment is indicated; it raises for consideration the possibility that associated organisms may be elaborating penicillinase or otherwise encouraging the growth of streptococci. At Fairfield Hospital more than 1750 scarlet fever patients had been managed with penicillin régimes by July 1, 1951. In our experience there has not yet been found in natural conditions a strain of *S. pyogenes* which is not sensitive to penicillin. Sensitivity tests carried out on *S. pyogenes* carriers after penicillin régimes have shown that the particular *S. pyogenes* has always been sensitive to penicillin in the laboratory, and that some other factors have operated in the rare cases of failure to produce early clearance of the streptococci.

Summary and Conclusions.

1. Penicillin was effective in the initial management of 404 patients suffering from scarlet fever.
2. Many patients may be returned to their homes in ten days, with benefit to hospital management, to municipalities and to patients.
3. Sequelæ of scarlet fever have been relatively few following penicillin treatment. Sequelæ are listed; *otitis media* is of note. Sensitivity phenomena occurred infrequently; they were not completely prevented by penicillin.
4. Brief speculation is made on the influence of penicillin on the state of immunity of scarlet fever patients.
5. Although details of treatment may need to be modified a little, main lines of management devolving from Jersild should be consolidated in the future.

Acknowledgements.

I am pleased to record the help given by Miss Kathleen Semmens, who carried out the bulk of the bacteriological examinations, and by Dr. Allan Ferris, who advised us on bacteriological procedures and carried out many of the

TABLE II.

Sequelæ of Scarlet Fever. ¹	Occurrence in 505 Patients Discharged from Hospital, July 1, 1925, to June 30, 1926 (Scholes), in Hospital.
Cervical lymphadenitis	11
Cervical abscess and other abscesses	7
Septicæmia and pyæmia	8
Otitis media	23
Mastoiditis	2
Arthritis	2
Nephritis	7
Uræmia	1
Bacilluria and pyuria	5
Relapse of scarlet fever	3
Deaths	7

¹ There were four cases of acute rheumatism in the year, which, however, were not classed with scarlet fever.

month after the conclusion of our series several groups of cases of mild nephritis were noted in country areas and a few cases in the metropolitan area; it is stated that not all these patients suffered an overt attack of scarlet fever.

There are elsewhere indications that there has been a change in dominance of certain types of streptococci. Carditis and nephritis may be related to the characteristic ability of organisms to produce sensitizing antibodies and

TABLE III.

Series.	Age in Years.				Total.
	Under 5.	5 to 10.	10 to 15.	Over 15.	
Patients discharged from hospital, April 1, 1950, to March 31, 1951	209	132	25	38	404
Patients admitted to hospital, July 1, 1925, to June 30, 1926 (Scholes)	87	173	74	161	495

to the characteristic tendency of patients to be sensitized. Burnet and Fenner (1949) considered that with living streptococci two types of antibody are produced, due to sensitizing and to immunizing agents.

Jersild (1948) measured the antistreptolysin titre and the erythrocyte sedimentation rate in scarlet fever patients treated with sulphonamides and with penicillin. It seems possible that the association of a low antistreptolysin titre with penicillin treatment may be a sign of fractional immunity to the streptococcus. Implications may be: (a) that the patient is not more likely to resist another bacterial invasion (as in *S. pyogenes otitis media*) than he would be without previous penicillin treatment; but (b) that the patient is not so likely to be sensitive to another bacterial invasion (as in scarlatinal rheumatic carditis or nephritis) as he would be if he had suffered recent scarlet fever without penicillin therapy. Penicillin treatment which has been given early and intensively may produce a hiatus in the step-by-step development of any particular patient's immunity.

Further work is needed on the biological characteristics of the streptococci, particularly on the sensitizing factors of the organism, and on the diathesis of rheumatic and nephritic patients. In these fields revival of an old notion and application of a relatively new therapeutic tool seem

laboratory examinations himself. This paper was presented in essence at a meeting of The Royal Australasian College of Physicians held at Fairfield Hospital on August 11, 1951. It was prepared with the permission of the Medical Superintendent of Fairfield Hospital, Dr. H. McLorinan, for whose advice I am grateful.

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A NEW SPLINT FOR THE THUMB.

By JOHN TONKIN,
Sydney.

WITH A COMMENT BY R. J. B. McEWEN,
Honorary Orthopaedic Surgeon, Saint Vincent's
Hospital, Sydney.

The following is a description of a new splint designed to hold the thumb in the position of opposition, which has been in use at the Saint Vincent's Hospital over the past six months.

The splint is made from aluminium and is cut to fit the individual hand, and is thus comfortable to wear. In addition, this splint possesses the following advantages common to all aluminium splints: (i) ease of manufacture, (ii) ease of application, (iii) translucency to X rays, (iv) lightness.



FIGURE I.

The splint will be found useful in all those conditions in which immobilization of the thumb in the position of opposition is essential. It has been found to provide adequate immobilization in fractures of the phalanges, dislocations and sprains. Together with a plaster technique for immobilizing the wrist, the splint provides the immobilization and traction needed for the treatment of Bennett's fracture.

The splint immobilizes only the thumb and does not interfere with the movements of the rest of the hand. It has been found especially useful in *opponens pollicis* palsy, in which the splint may be taken off daily and the thumb put through the full range of movements.

Specifications.

The photographs accompanying this article (Figures I, II and III) will show the "Y" shape of the splint when cut, and also the splint as it appears when applied. Although this is not shown in the photographs, the splint is secured to the thumb and hand with half-inch or narrower strips of strapping, to insure better immobilization.

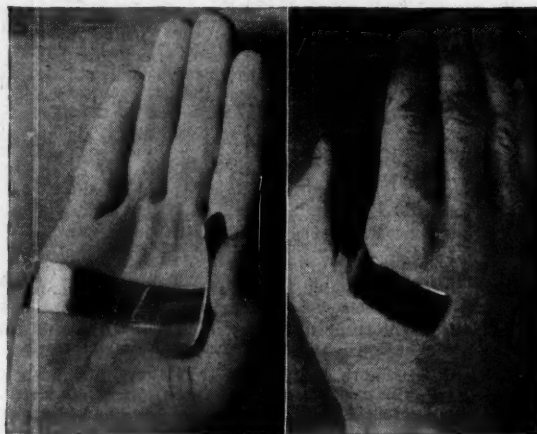


FIGURE II.

FIGURE III.

For the average adult hand the width of the splint is three-quarters of an inch. The length of the splint is twice the width of the palm of the hand. The length of the arm of the "Y" is the length of the thumb itself. The distance between the two arms at the open foot of the "Y" is one inch and at the apex half an inch.

No modification except reduction in size is needed for the thumb of the child.

Comment (R.J.B.McE.).

Dr. Tonkin's splint is the simplest one yet devised for resting the thumb in the position of opposition. Its chief value is in *opponens pollicis* palsy, and it allows unimpeded function of the remainder of the hand. In addition, it can be fashioned at the bedside by the doctor, nurse or physiotherapist.

A DRINKER RESPIRATOR ALARM.

By A. D. D. PYE,

General Superintendent, Brisbane Hospital,
Brisbane.

MR. HAROLD LLOYD, senior electrician at the Brisbane Hospital, has devised an attachment which is fitted to the top of the respirator and causes a warning by lamp and bell when the vacuum falls by as much as one pound. This may be caused in many ways—for example, (a) slipping belts giving a partial vacuum, (ii) failure of the power supply, (iii) development of a hole in the bellows, (iv) leaking in of atmospheric air due to hinged closures not being screwed down securely, (v) escape of air around the patient's neck.

The attachment consists of a tube one inch in diameter with a piston and a foot valve; a rod from the piston acts

as a contact for the light and bell. When the respirator is under vacuum the foot valve and the piston are pulled down on the next cycle (atmospheric pressure) and a spring closes the foot valve; the piston is then in a partial vacuum, as air leaks in between the foot valve and the bottom of the piston, and with the help of a spring the piston rod will rise slowly towards an adjustable contact which can be set to suit the full range of vacuums. If the vacuum is normal on the next cycle and before the piston

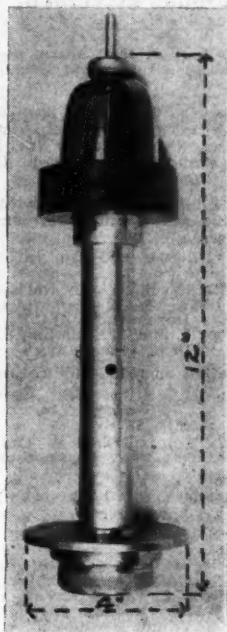


FIGURE I.

can make contact, it will be pulled down again. When the patient is removed from the respirator the seal clamp on top of the respirator is wired to act as a disconnecting switch for the alarm.

The alarm has been in operation for three months and has been most satisfactory to both patients and nursing staff. By moving the neck and thus allowing air to enter the respirator, the patient can utilize it to call for attention.

Reviews.

SOCIAL MEDICINE AND PUBLIC HEALTH.

THE text-book on social medicine and public health, well known as Jameson and Parkinson's "Synopsis of Hygiene", first published in 1920, has now reached its tenth edition.¹ This has been edited and partly rewritten by Llywelyn Roberts, the Medical Officer of Health of Sheffield, England, assisted by Kathleen M. Shaw, of the London School of Hygiene and Tropical Medicine, who also assisted in the production of the ninth edition which appeared five years ago.

Since 1944 a large body of social legislation has come into being which has wrought great changes in the social structure and the conditions of medical practice in Britain. The increasing emphasis on the social factors in preventive medicine consequent on this legislation is naturally reflected in the content of the volume.

¹"A Synopsis of Hygiene (Jameson and Parkinson)", by Llywelyn Roberts, M.D., M.R.C.P., D.P.H., assisted by Kathleen M. Shaw, M.B.E.; Tenth Edition; 1952. London: J. and A. Churchill, Limited. 9" x 6", pp. 900, with 11 illustrations. Price: 42s.

Roberts has followed in the main the lines adopted by the original authors, but the incorporation of a large amount of new material resulting not only from advances in medical research but also from the above-mentioned legislative changes has made the addition of an extra section necessary, with consequent rearrangement of some of the subject matter. It has also unavoidably disturbed to a certain extent the balance of the work, and this has lessened its value to the Australian reader. The first four sections, which constitute about half the volume, deal with those topics which may conveniently be grouped under the head of "Social Medicine". The final section, and one of the five appendices, together occupies at least another quarter of the volume and is devoted to public health law in England and Wales, and to the rules of the General Medical Council concerning the Diploma of Public Health. Thus three-quarters of the volume have no direct application to this country.

The remaining quarter is, however, of use to the Australian candidate for the Diploma of Public Health. It comprises five sections and four appendices. One section treats of food and nutrition, and the other four treat of the various aspects of environmental sanitation. The appendices form a useful "memory refresher" in elementary physics, conversion tables, composition, energy value and vitamin content of various foodstuffs, and climatological calculations—all very convenient to have at hand for ready reference in a work of this nature.

The interpolation of bibliographic references at the end of each subsection makes for easy and uninterrupted perusal. Although this work has only a limited value to the Australian candidate for the Diploma of Public Health, it contains much that is of value to those medical practitioners who are following with close interest the recent developments in the social services in Britain and their effect on the practice of medicine. For this reason it can be recommended for inclusion in all medical libraries.

Notes on Books, Current Journals and New Appliances.

AUSTRALASIAN ANNALS OF MEDICINE.

THE first number of *Australasian Annals of Medicine*, the journal of The Royal Australasian College of Physicians, has appeared. It is an impressive publication, being printed on art paper and having a light coloured cover embossed with the College coat of arms. There are 92 pages and the letterpress is printed in two columns to a page. A. W. Holmes & Co. writes a short foreword, then follow a series of original contributions, and at the end of the volume are recorded some of the proceedings of the College. The articles cover a wide field and are illustrated with half-tone and line drawings. The first article by Sir Neil Hamilton Fairley deals with the chemoprophylaxis and chemotherapy of malaria. E. S. J. King writes on the hemodynamics of subintimal hemorrhage. R. B. Blacket and several co-authors deal with Epstein's disease and report five cases. Cyril Fortune writes on vascular abnormalities of the lung, and T. E. Lowe and B. McA. Sayers discuss control of the water content of the body. E. G. Saint and S. Weiden write on the malabsorption syndrome, and E. J. Halliday describes a dissecting aneurysm of the aorta confirmed by angiocardiology. Then follow articles by Eva A. Shipton on the Pelger-Huet anomaly of the leucocytes, by R. N. Lyons on the role of blood coagulation in the production of hemolysis in paroxysmal nocturnal hemoglobinuria, by P. M. Rountree and R. G. H. Barbour on antibody to the erythrocyte-coating polysaccharide of staphylococci, and by A. F. Knyvett on hemorrhagic disease due to a circulating anticoagulant. The journal will appear twice a year. The subscription is thirty shillings per annum, payable to the Secretary of The Royal Australasian College of Physicians, 145 Macquarie Street, Sydney.

"FAMILY DOCTOR."

As attractive and as sound as ever is the June, 1952, number of "Family Doctor", the British Medical Association's popular monthly magazine. The coloured cover, depicting youth and age in the red coats of Chelsea Pensioners, is outstanding, and an article inside the magazine discusses old

age with the Chelsea Pensioners as its background. Parents will find helpful (as well as readable) articles on shoes for teen-agers, bottle-fed babies, the nursing of small children at home, the beginnings of talking in babies and the spread of disease by common animals, as well as hints on jam-making and on vegetable-cooking and lots of smaller features. Other subjects interestingly treated are varicose veins, the brain, the working of the mind (especially in relation to the operation of prefrontal leucotomy) and the experiences of a doctor in the Antarctic. Apart from its entertainment qualities and general medical educational value for the layman, "Family Doctor" offers in sound and readable form detailed information that many doctors wish they had time to give their patients. The busy and conscientious family doctor will do well to keep in touch with his literary counterpart and recommend it to his patients. The annual subscription is twenty shillings (sterling), including postage, and the Australian agents are Gordon and Gotch (Australia), Limited.

INDUSTRY AND TROPICAL HEALTH.

IN December, 1950, delegates of 23 major industries and 10 government, international and private organizations met at the Harvard School of Public Health for an Industrial Tropical Health Conference.¹ The proceedings, which have now been published, cover a wide range of subjects. The twelve sessions were concerned with industry and health in the Middle East, Tropical Africa, the Far East and Tropical America, industry's future in tropical health, the organization of industrial health services, antibiotics in certain tropical diseases, nutrition, current research at the Harvard School of Public Health, infectious diseases and problems of control, industrial health hazards and some miscellaneous subjects. Many men distinguished in their fields took part in the conference, and the proceedings should be of interest and value to many readers. The volume is well produced.

THE INSTITUTE OF MEDICAL RESEARCH, KUALA LUMPUR.

IN order to celebrate the completion of fifty years of service, the Institute of Medical Research of the Federation of Malaya has published a jubilee volume.² This is a volume of about 400 pages. It starts with a review of the historical, racial and cultural background of western medicine in Malaya, and this article is followed by a review of the work of the Institute over fifty years. Then follow a series of articles on the historical trends in Malayan medicine. The biographical retrospect is full of interest, and in the section dealing with the Institute as it is today are published a series of interesting photographs. The Institute is to be congratulated on the production of this volume.

A HANDBOOK OF FIRST AID.

THE nineteenth edition of "Warwick and Tunstall's First Aid to the Injured and Sick", edited by A. P. Gorham, is not altered from previous editions except for changes necessary to bring it up to date.³ Described as "an advanced ambulance handbook", this volume contains more detailed information than some other first-aid books, especially in Part I, which is concerned with the structure and functions of the body; it is debatable whether some of the detail is necessary for the non-medical reader, but presumably it is

¹ "Industry and Tropical Health: Proceedings of the First Industrial Tropical Health Conference, Sponsored by the Harvard School of Public Health, December 8-10, 1950, at Boston, Massachusetts"; 1951. Boston: The Harvard School of Public Health, for the Industrial Council for Tropical Health. 11" x 8", pp. 316, with many illustrations. Price: \$10.00.

² "Studies from the Institute for Medical Research Federation of Malaya", by various authors; 1951. Jubilee Volume No. 25. The Institute for Medical Research, 1900-1950. Kuala Lumpur: The Government Press. 10" x 7½", pp. 404, with 112 illustrations.

³ "Warwick and Tunstall's First Aid to the Injured and Sick: An Advanced Ambulance Handbook", edited by A. P. Gorham, M.B., Ch.B., M.R.C.S., L.R.C.P., D.A.; Nineteenth Edition; 1952. Bristol: John Wright and Sons, Limited. 7" x 4½", pp. 284, with 288 illustrations. Price: 6s. 6d.

acceptable to the advanced student of first aid. The first-aid teaching is of standard character. The editor points out in his preface that extreme views and controversial methods have been avoided, and in a number of cases alternative methods of treatment are stated suited to varying conditions under which they will be practised. The index is sufficiently detailed to be really useful.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Group Treatment in Psychotherapy: A Report of Experience", by Robert G. Hinckley, M.D., and Lydia Hermann, M.S.; 1951. Minneapolis: University of Minnesota Press. London: Geoffrey Cumberlege, Oxford University Press. 9½" x 6½", pp. 146. Price: 31s. 6d.

Based on the authors' experience with group psychotherapy in the Students' Mental Hygiene Clinic of the University of Minnesota.

"Progress in Clinical Medicine", by various authors, edited by Raymond Daley, M.A., M.D. (Cambridge), M.R.C.P., and Henry Miller, M.D. (Durham), M.R.C.P., D.P.M.; Second Edition; 1952. London: J. and A. Churchill, Limited. 9½" x 6½", pp. 438, with 43 illustrations. Price: 30s.

Almost entirely rewritten since publication of the previous edition in 1948.

"Living in Balance", by Frank S. Caprio, M.D.; 1951. Washington: The Arundel Press, Incorporated. 8½" x 6", pp. 256. Price: \$3.75.

Written for lay readers, this book seeks to help neurotics to understand and aid themselves.

"Recent Advances in Medicine: Clinical, Laboratory, Therapeutic", by G. E. Beaumont, M.A., D.M. (Oxon.), F.R.C.P., D.P.H. (London), and E. C. Dodds, M.V.O., D.Sc., Ph.D., M.D., F.R.C.P., F.R.I.C., F.R.S. (Edinburgh), F.R.S.; Thirteenth Edition; 1952. London: J. and A. Churchill, Limited. 8½" x 9½", pp. 412, with 59 illustrations. Price: 27s. 6d.

This edition contains about 200 pages of new material and 29 new figures. A good deal of material has been discarded from the previous edition.

"A Clinical Atlas of Blood Diseases", by A. Piney, M.D., M.R.C.P.; Seventh Edition; 1952. London: J. and A. Churchill, Limited. 8½" x 5½", pp. 144, with 48 illustrations, 45 in colour. Price: 21s.

The last edition was in 1945, since when the co-author, Stanley Wyard, has died.

"A Course in Practical Biochemistry: For Students of Medicine (Cameron and White)", revised by Frank D. White, A.R.T.C., Ph.D. (Edinburgh), F.R.I.C., and George E. Delory, M.Sc., Ph.D. (London); Sixth Edition; 1952. London: J. and A. Churchill, Limited. 8½" x 5½", pp. 234, with 23 text figures. Price: 17s. 6d.

A largely rewritten edition of a book consisting of "a series of exercises designed to train medical students in the practical tests and procedures used in biochemical work".

"Textbook of Medicine", by various authors, edited by John Conybeare, K.B.E., M.C., D.M. (Oxon.), F.R.C.P., and W. N. Mann, M.D. (London), F.R.C.P.; Tenth Edition; 1952. Edinburgh and London: E. and S. Livingstone, Limited. 9½" x 7", pp. 928, with 81 plates and 31 text figures. Price: 37s. 6d.

The last edition, edited by Sir John Conybeare alone, was published in 1949. This edition, with W. N. Mann as joint editor, is considerably revised and partly rewritten.

"An Introduction to Abdominal Diagnosis: A Handbook for Students and Practitioners", by Alan E. Lee, M.D. (Melbourne), F.R.C.S. (England), F.R.A.C.S.; 1951. Sydney: Australasian Medical Publishing Company, Limited. 10" x 6½", pp. 176, with three text figures. Price: 32s. 6d.

"It is the main purpose of this book to study the nature of abdominal symptoms and to enunciate an acceptable theory by which they may be related to their various causes."

The Medical Journal of Australia

SATURDAY, JUNE 21, 1952.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

SOCIAL MEDICINE.

In relation to the isolated individual, the art of preventing and curing disease is known as private medicine. In relation to the community as a whole, it is public medicine. In relation to those people and classes whose conditions call for special measures, it is social medicine. As the protector of health, even of life itself, medicine is the guardian of values fundamental to the individual and the community alike; it cannot fully realize its mission unless its character is simultaneously private, public, and social.

THESE words form the opening paragraph of the introduction to "The Advance to Social Medicine", a book recently published by René Sand.¹ Many medical practitioners are not seized with the full significance of the term "social medicine" and quite a number of those who do know what it means prefer not to bother about it. It is perhaps well, at the outset, to declare, as we have declared on previous occasions, that social medicine is not the same as what has been called "socialized medicine". The quotation from Sand's introduction sets social medicine in its proper place. We all know what private medicine means, and we all have a more or less adequate conception of the place that public medicine should take in the life of the community. When we think of social medicine we have to realize that the life of our own community, in common with that of most other countries, is undergoing daily change and that this social evolution, inevitable and irresistible, must be so guided that a man will be able to make the best possible use of his powers as an individual and give an intelligent contribution to the life of society as a whole. In a previous discussion on this subject (see THE MEDICAL JOURNAL OF AUSTRALIA, January 10, 1945, page 39) it was stated that all writings on social medicine had been undertaken because an academic consent to the principles of social medicine was not enough. It was also stated that if Australian medicine

was to fulfil its destiny on its own initiative, academic consent would have to give place to enthusiasm, resource and audacity. On that occasion discussion centred round an address given by Professor F. A. E. Crew, Professor of Public Health and Social Medicine in the University of Edinburgh. Professor Crew stated that preventive medicine was "medical science applied to the elimination of sickness, by appropriate social and collective procedures based upon the findings of clinical medicine and the ancillary sciences. . .". He also explained that although it included both preventive medicine and industrial medicine, it differed from them in that it was not merely or mainly concerned with the prevention and elimination of sickness, but was concerned also and especially with the study of all social agencies which promoted or impaired the full realization of biologically and socially valuable human capacity. To have this as an objective is surely the best possible attribute of medicine today. The publication of Sand's book makes another reference to social medicine opportune. Indeed, the book appears at a time when the attention of medical men and women throughout the world should return to this subject. If they read Sand's book they will at least be well informed.

In order, as Sand puts it, to appreciate fully the immense scope of social medicine, it is necessary to study the elements which have given it birth. He therefore deals successively in regard to their evolution from ancient times with medical practice, hospitals, personal hygiene, public health and social hygiene, industrial medicine and the medical services of public assistance, the friendly societies, and finally with the separate sciences concerning man himself. He holds that all these "separate streams" converge and intermingle to form the science of social medicine. In the chapter on the history of the medical profession, Sand points out that "the medical problem" is a problem of all time. From the earliest times doctors have always deplored the insecurity of their profession, the competition of quacks, the advantage taken of free treatment, the inadequacy of their fees, the effrontery of non-payers, and the professional disloyalty of some of their colleagues. The mass of the people, on the other hand, have suffered just as long from the high cost of medical care and the fact that it is only too often hasty, impersonal, disjointed and in any case unequally distributed between the inhabitants of cities, small towns and rural areas. The problem today has its root in causes which may be placed under three headings—technical, psychological, and most important of all, economic. Under technical causes come the specialization of medicine, the development of scientific methods of diagnosis and treatment, and the much larger part that the doctor is now called upon to play. Psychological factors are, on the doctor's side, individualism and particularism; on the patient's side are found reluctance to seek advice either through carelessness or through fear of an unfavourable verdict, reliance on spontaneous cure or on advertised preparations, discouragement when medical intervention does not produce immediate results, and fickleness in the choice of doctors. The economic factor is revealed in the attempts to make medical care available to all members of the population. Sand writes that "to give every care to every member calls for such a basic reformation of medical practice that the prospect causes apprehension

¹"The Advance to Social Medicine", by René Sand; 1952. London: Staples Press. 9" x 6", pp. 668. Price: 42s.

to many doctors and their professional associations". Lack of space prevents the setting out of any details of Sand's argument, but it is important to note his contention that the theory of *laissez-faire* has been abandoned by economists in favour of rationalization, and that doctors must inevitably follow the same road. Whatever solution is proposed, it should ensure the best and most comprehensive medical service for all, and this service should aim, not only at cure, but also at physical, professional and mental rehabilitation, not only at the protection, but also at the promotion of health. The solution should respect the liberty of doctor and patient, safeguard professional secrecy, assign direction of medical services to doctors themselves, allot them adequate representation on controlling bodies, and protect them against arbitrary action. In other words, medicine should be rationalized without sacrifice of the personal element; collaboration in place of competition should be its aim. This statement may partly anticipate the general conclusion, which it undoubtedly qualifies, but it must be made at this stage of the discussion.

Having traced the evolution of medical practice, of hospitals, of hygiene, of industrial medicine, of social assistance and social services, and of the sciences of man, Sand deals with what he calls "the advent of social medicine". He points out that in every one of the fields just mentioned, dominant influences of the present day reveal three main trends. The first has to do with scientific and technical progress. As a result, our methods are steadily increasing in efficiency, but they are also becoming more complex and more costly. The second has to do with the desire for the fullest possible return and the greatest possible economy, which make rationalization of effort necessary. The third has to do with communal feeling and public interest which demand that the benefits of scientific and technical advances should be brought within the reach of everybody. Sand points out that it was in about 1900 that these trends asserted themselves in different spheres, but that progress was slow and almost unnoticed until the First World War broke out. It then became evident that the human factor had been largely neglected. During the Second World War, Great Britain and the United States adopted the principles of social medicine. In England, in spite of all the disabilities and restrictions of those days, the general mortality rapidly declined and infant mortality sank below the pre-war figure; maternal mortality and stillbirths have continued to decrease and the birth rate is increasing. The advance of social medicine may be said to have been continuous, since every branch of medicine has its social aspect. It has even been claimed by Simonin that there is a social therapeutics, since therapeutic action should take social, economic and legislative factors into consideration. Sand describes components of social medicine as four in number: social medical demography; socio-medical anthropometry; socio-medical pathology and clinical study; and social hygiene. He holds that each of these components must be considered from the individual as well as from the collective point of view, and with regard to the medical as well as the social factor.

If the advance of social medicine is to continue, it is clear that its principles must be taught and its practice encouraged. It has aspects in relation to both the patient

and the doctor. The part which should be taken by the doctor has been made clear. In regard to the patient, it is necessary that communal organizations should furnish necessary funds and equipment. Sand thinks that in most medical schools the economic, professional and social aspects of medicine are not taught as a part of the regular curriculum. The students may catch occasional and incomplete glimpses of the subject, but they skirt it and never penetrate it. "Their biological training is admirable, their social training practically nil." Sand holds that occasional teaching is not enough. A systematic course on the subject must be given, and this must be reinforced with visits to agencies, active work in them and personal participation by the student. Four items are mentioned in connexion with instruction in social medicine proper. They comprise: (a) a theoretical course; (b) clinical lectures from the socio-medical angle; (c) visiting and practical work with voluntary organizations and public services; (d) hospital work and attendance at a seminar in social medicine.

If social medicine is to flourish in the ranks of the community, that is to say, among medical practitioners and among those whom they serve, it must be adopted from choice and not from compulsion. One can imagine that occasions will arise when compulsion will have to be used. This should be a rare event. Sand holds that what we need is to develop human personality actively, individually and from within, in order that it may attain full maturity and find its satisfaction in social productivity. Everyone will give lip service to the statement that no one should at any time lack the means necessary to maintain complete physical and mental health. This is the aim of social medicine. Social medicine is, as Sand rightly maintains, a philosophy, a point of view, and this cannot be forced on to anyone. These things must be done because of personal conviction, and in this the medical profession, and no one else, must set the lead.

Current Comment.

ULTRASONIC ECHOES IN BIOLOGICAL RESEARCH.

It was only to be expected that echo-ranging techniques with ultrasonic energy would be applied to the investigation of the histological structure of organic tissues. John J. Wild and John M. Reid, of the Department of Electrical Engineering in the University of Minnesota, have made use of this principle and have published what they explain is only a preliminary communication, but which gives, after reference to earlier attempts, a detailed description of the methods pursued.¹ The particular value of the physical procedure outlined is to detect a tumour or other departure from normal in the midst of a living tissue. Briefly the method is this. A narrow beam of 15 megacycle ultrasonic energy is sent in rhythmic pulses into the tissue investigated and the echoes are caught in the very same crystal which liberated the pulses and turned into electric currents which can be amplified and recorded. The record is called an echogram and the process echography, an ugly word but linguistically permissible though it should be remembered that the "e" is long in Greek. An electronic

¹ John J. Wild and John M. Reid (1952), "Application of Echo-Ranging Techniques to the Determination of Structure of Biological Tissues", *Science*, Volume CXV, February 29, page 226.

clock dictates the tempo; connected with this is a "transmitter" which generates electric impulses and these are sent along to a piezoelectric crystal which produces the ultrasonic discharge. The rhythm is so adjusted that the echoes come back to the crystal in its quiescent period and these generate electric currents which can be amplified and recorded. Naturally other echoes are produced than those emanating from the tissue itself; thus parts of the apparatus and containers will reflect the bursts of ultrasonic energy, but these echoes are constant and easily detected in the echogram. The simple method described above is called by the authors "unidimensional echography" and is analogous to a needle biopsy. The important development is described of moving the crystal and sending the waves of energy from different sequent angles and so establishing two-dimensional echography. As ultrasonic energy waves can disintegrate living tissue and so do damage, the precaution is taken of having their power low and the period of their application brief. There is a tendency amongst many American medical research workers to speak slightly of certain colleagues as "gadgetsers"; but it would be a mistake to label this method of investigation superfluous, though no proof has so far been given that the echogram is superior or indeed equal to a good X-ray picture. The future will decide.

WHEAT FLOUR AND CELIAC DISEASE.

A GOOD DEAL of success has been achieved in the treatment of coeliac disease by essentially empirical dietary methods, and from this point attempts have been made to work back to an understanding of the aetiology and pathogenesis of the condition, but with only limited success. Some time ago we referred to a paper by S. V. Haas, originator of the banana treatment of coeliac disease, who brought forward evidence to indicate that the complex carbohydrates were the dietary elements not tolerated by the child with coeliac disease, or at any rate the elements responsible for faulty food absorption. More recently workers in Holland have produced improvement in the condition of children with coeliac disease by excluding wheat and rye flour from their diet. A decrease in faecal fat content was produced. Deterioration followed reintroduction into the diet of wheat flour, but not of wheat starch. This Dutch work is quoted in an important recent paper from the departments of pharmacology and of pediatrics and child health in the University of Birmingham.¹ Its authors are Charlotte M. Anderson, A. C. Frazer, J. M. French, J. W. Gerrard, H. G. Sammons and J. M. Smellie. In it are reported studies aimed, firstly, at establishment of the nature of the alteration in gastro-intestinal function in coeliac disease and, secondly, at investigation of the effect of dietary wheat flour on the syndrome. The biochemical, radiological and other findings from a careful study of ten children with characteristic coeliac disease are set out in the paper and need not be recapitulated here; it is sufficient to note that the changes in gastro-intestinal function appear to be identical with those of adult idiopathic steatorrhoea. After these basic studies had been completed an investigation of the influence of wheat was carried out in two stages: first, by giving the child an entirely wheat-free diet; second, by the reintroduction into the diet of wheat flour, wheat starch, or wheat gluten. Exclusion of wheat flour from the diet produced rapid clinical improvement, and its reintroduction brought rapid deterioration. Children having a diet containing wheat flour were then changed to a diet containing biscuits made with pure wheat starch but otherwise free from wheat, and showed improvement comparable with that produced by excluding wheat. On the other hand children in a state of remission after exclusion of wheat from their diet relapsed when given wheat gluten. This last-mentioned observation is particularly significant, and it should be noted that six normal children, used as controls, were unaffected by the introduction of gluten into their otherwise normal diet.

In the discussion on these findings it is pointed out that as children with coeliac disease appear to have the same radiological changes in the small intestine and the same biochemical abnormalities as adults with idiopathic steatorrhoea, it seems likely that they suffer from the same defect of absorption in the upper part of the intestine, probably affecting all substances. In all the cases studied, a large increase in faecal fat content was associated with the normal hospital diet; most of this fat apparently came from the diet; and the presence of an absorption defect is indicated. It is thought that the absorption defect may be due to excessive mucus secretion or to lack of intestinal motility, or to both. It was found in these studies that the striking clinical improvement associated with a wheat-free diet was accompanied by parallel increase in the absorption of fat. Wheat causes deterioration in children with coeliac disease but not in normal children, and the gluten is apparently the fraction responsible. The incrimination of starch by many previous investigators would seem to have been due to a misinterpretation of the findings—account was not taken of the fact that removal of starch from the diet involved incidentally removal of gluten.

The Birmingham studies, it is pointed out, indicate that even in the early stages of treatment of coeliac disease there is no need to restrict carbohydrate or even fat intake; an almost unlimited choice of food may be made provided that wheat and rye flour are excluded. A high caloric diet may be given throughout, with biscuits made from cornflour, soya flour or wheat starch instead of bread. All the children sent home from hospital on this diet have so far remained in normal health. The dietary control of coeliac disease has thus been simplified. The precise way in which the gluten fraction disturbs gastro-intestinal function in coeliac disease is being further investigated, and it seems reasonable to hope that the results of these investigations will tell us much more of the essential nature of the syndrome. One point on which these studies do not touch (naturally enough, as they are essentially concerned with children) is the effect of similar dietetic measures on adults with idiopathic steatorrhoea. Since all the evidence tends to show that the changes in gastro-intestinal function are similar, perhaps identical, in the two diseases, it would be of practical interest to know how wheat gluten, its absence or its presence, affects the adult syndrome.

THE TREATMENT OF MYASTHENIA GRAVIS.

FOR some years now the main standby in the treatment of *myasthenia gravis* has been neostigmine, either as the bromide or as the methylsulphate salt. The other form of treatment that has attracted attention is thymectomy; though not esteemed uniformly by all workers, it is generally accepted as of value in selected cases. Other measures have since been suggested, and particularly with the recent trial of ACTH, stock-taking on the therapy of *myasthenia gravis* is appropriate just now. This has been done in a paper by N. S. Schlezinger² on the basis of a relatively wide experience of this fairly uncommon disease. Schlezinger rates ephedrine as a valuable drug in the treatment of *myasthenia gravis* and considers combined neostigmine and ephedrine the treatment of choice in most cases. In comparison potassium and guanidine produce relatively slight benefit and have undesirable side effects. The effectiveness of tetraethylpyrophosphate and octamethylpyrophosphoramide is outweighed by toxic effects. The treatment of concurrent hyperthyroidism is important. Thymectomy is for patients with demonstrable thymomata and a selected few inadequately controlled with neostigmine and not helped by ACTH. The value of ACTH is not yet decided. Schlezinger's experience seems to have been one of favourable response in all cases, followed by relapse in most but not all. However, it appears advisable to refrain from use of ACTH if repeated relapse follows a relatively short interval of improvement.

¹ *The Lancet*, April 26, 1952.

² *The Journal of the American Medical Association*, February 16, 1952.

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Experimentally Produced Syndrome Resembling Pregnancy Toxæmia.

G. M. C. MASSON, A. C. CORCORAN AND I. H. PAGE (*The Journal of Laboratory and Clinical Medicine*, August, 1951) describe the experimental production of a syndrome resembling toxæmia of pregnancy. They used albino female rats from which one kidney had been removed. It was known that in such animals administration of a diet of high sodium content, together with desoxycorticosterone acetate, would elicit changes similar to those found in hypertensive disease, while use of the enzyme renin on the other hand would cause diuresis and sodium loss. It was decided to test the effect of combining the two substances in such animals, as well as observing control groups of animals to verify the separate effects. For a period of forty days fourteen controls which had undergone nephrectomy and were given extra sodium chloride in drinking water were compared with a group of 27 animals which had undergone nephrectomy and were given a similar diet with the addition of subcutaneous implants of DOCA. The blood pressures of animals in the control group averaged 115 millimetres of mercury, and those in the DOCA group 171 millimetres of mercury. Both groups were then given renin. The control rats responded with increased urinary flow; half the DOCA group of rats were waterlogged with diminution of urine, and four died. The survivors showed increased urinary flow. The onset of the terminal illness did not appear to be associated with the severity of the arterial disease produced after nephrectomy. The rats which died early usually had convulsive seizures. The authors were impressed with the analogy between this disease and that found in the last trimester of human pregnancy, but point out that in these animals there was no placenta in which to seek lesions, and that the hepatic lesions of pregnancy toxæmias were not present in the rats. They discuss the similarities and the differences, and further show that various substances other than renin, such as pitressin, thromboplastin and trypsin, do not produce the syndrome in DOCA-treated hypertensive rats.

Antibodies to Three Types of Poliomyelitis Virus.

JOHN R. PAUL, JOHN T. RIORDAN AND J. L. MELNICK (*The American Journal of Hygiene*, September, 1951) have estimated antibodies to three different antigenic types of poliomyelitis virus in sera from North Alaskan eskimos. The subjects from whom sera were obtained were believed not to have been exposed to the disease since 1930, when two deaths were recorded in the villages. An earlier study of a qualitative nature had revealed that persons under the age of twenty years had no antibodies to the Lansing strain, while 80% of those over the age of twenty years had

such antibodies. Therefore the experiments were extended on a quantitative basis; three dilutions of serum (1:2, 1:10, 1:100) were mixed in 0.03 millilitre of suspension of virus and stood for one hour, and were then inoculated into the brain of a Swiss mouse. Eight such animals were included for each serum sample under test for Lansing antibodies. In view of the belief that Lansing antibodies are heat stable, some parallel tests were performed with heated and unheated samples of serum. Tests for antibodies against Brunhilde and Leon strains of poliomyelitis were carried out by intracerebral inoculation of similar serum-virus mixtures in 0.4 millilitre amounts into monkeys. It was found that Lansing antibodies were almost absent in serum from patients under twenty years of age, while up to fifty years there were titres of up to 1:100 dilution of serum, and the antibodies still exerted their protective effect after the serum had been heated. Antibodies to Brunhilde and Leon strains appeared in two ten-year peaks in patients aged over twenty years with Brunhilde, and over thirty years with Leon, suggesting that these strains had been present in the community at longer distant dates than the Lansing strain. The results also suggest that neutralizing antibodies can persist in a population in the absence of overt cases of the disease.

Adsorption of Proteins on Erythrocytes and Subsequent Haemagglutination.

STEPHEN V. BOYDEN (*The Journal of Experimental Medicine*, February, 1951) has studied the adsorption of proteins on erythrocytes treated with tannic acid and subsequent haemagglutination by antiprotein sera. The technique was evolved to test a theory that there are two distinct phases of the process of haemagglutination: first, the alteration in the surface of the red cell, and second, the adsorption on that altered surface of the cell by other molecules of a particular type. Some samples of inulin were found, when mixed with red cells, to enable the cells to take up proteins from solution, and later, after washing with saline, to be agglutinable by the corresponding protein antisera. Tannic acid was found to act similarly and to be much more reliable in its effects, and so was tested further. Sheep erythrocytes in buffered saline were suspended in dilute solutions of tannic acid (a dilution of 1:20,000 was found effective for routine use) and kept at 37° C. for ten minutes, washed and then added in suitable dilution to specific antiserum; specific haemagglutination was observed after two hours. Cells treated with tuberculin following tannic acid were agglutinated in the presence of antituberculous serum diluted to 1:16,000. Tests with 25 human sera of patients suspected of having tuberculosis and tannic acid-treated cells exposed to tuberculin showed high titres for patients with active tuberculosis and an absence of haemagglutination for sera from 10 patients with other diseases. Comparison was made between the direct sensitization of erythrocytes with tuberculin and that following tannic acid treatment, and the direct method showed considerably lower titres in serum from tuberculous patients. The authors suggest that possibly two different mechanisms are involved in these differing results. The

uses of the reaction with tannic acid-treated cells are being investigated further.

Diphtheria Toxin and Antitoxin.

C. G. POPE, MURIEL F. STEVENS, E. A. CASPARY AND E. L. FENTON (*The British Journal of Experimental Pathology*, June, 1951) have published some new observations on diphtheria toxin and antitoxin. They state that in an endeavour to repeat estimations of the flocculation time of mixtures of different samples of purified toxin with the same antitoxin in solutions of varying phosphate buffer content, they found widely varying results in milligrammes of nitrogen present in the floccules, suggesting that the toxins were not identical or pure. They then used the agar gel diffusion method, placing in the lowest part of their tube gelatin containing 1000 to 2000 units of antitoxin per millilitre, then a column of gelatin, and then a sample of toxin of about 2000 Lf. units per millilitre. The mixtures were allowed to diffuse, and in the central gelatin lines of precipitate of varying density developed indicating the presence of a number of different antigens and the fact that their antibodies were reacting. A third method was used of obtaining floccules from a mixture, washing them and treating them with fresh toxin, when further flocculation took place; the floccules would also react in the gel test. Evidence was obtained that these protein antigens were enzymes, and that the optimum pH varied, the enzymes from *gravis* strains of toxin appearing more active at alkaline pH values. Some of the samples of antitoxin prepared from strain "P.W.8" did not appear to contain antibodies to these, while varying amounts of antitoxin were needed to neutralize the other enzymes. The authors believe that they have shown that diphtheria toxin has not yet been obtained as a pure substance.

The Cultivation of Poliomyelitis Viruses in Tissue Culture.

F. C. ROBBINS, J. F. ENDERS, T. H. WELER AND G. L. FLORENTINO (*The American Journal of Hygiene*, September, 1951) have published one of a series of studies on the cultivation of poliomyelitis viruses in tissue culture with a description of the direct isolation and serological identification of virus strains in tissue culture from patients with non-paralytic and paralytic poliomyelitis. It has been found that tissue culture fibroblasts grown from kidney tissue or uterine muscle of the human, or from monkey testis, are specifically inhibited by the presence of poliomyelitis virus, and that serum from an immunized animal or recovered patient specifically prevents this effect. Faecal suspensions prepared from frozen specimens were prepared by treatment with penicillin and streptomycin and centrifugation, and were inoculated into the tissue culture medium in which the pH changes were watched and the fluid was replaced as necessary. When the virus was present, the inhibition of the fibroblasts was obvious within twelve days. Subcultures were made from tubes as necessary, and viruses were identified by neutralization tests with known antisera. The results recorded show nine isolations of virus from faeces of patients with paralytic poliomyelitis,

five isolations from six patients with non-paralytic poliomyelitis, and no isolations from five patients with diseases other than poliomyelitis. One isolation was made from the spinal cord in a fatal case. The serological neutralization tests showed 10 of the viruses to resemble Leon strains and three Brunhilde strains.

HYGIENE.

Psittacosis (Ornithosis) from Working with Turkeys or Chickens.

J. V. IRONS, T. D. SULLIVAN AND J. ROWEN (*American Journal of Public Health and The Nation's Health*, August, 1951) describe the salient epidemiological, clinical and laboratory findings in an outbreak of psittacosis among workers at a large poultry processing factory. There were 22 cases of psittacosis and three deaths among 78 employees. Epidemiological investigations revealed that the discharges from a group of turkeys constituted the most probable source of infection. It seemed very doubtful that any of the patients infected with psittacosis had acquired infection from chickens. The affected patients as a group presented a syndrome characterized by fever, constitutional symptoms and minimal signs or symptoms referable to the respiratory tract. "L.G.V." complement-fixation titres for the *lymphogranuloma venereum*-psittacosis group of infections generally reached and maintained high levels, at least for some weeks. The authors suggest that the importance of common farmyard birds in the spread of psittacosis is frequently overlooked.

Brucellosis of Livestock.

C. K. MINGLE (*American Journal of Public Health and The Nation's Health*, August, 1951) considers that, in view of the economic and public health benefits that can be expected from the elimination of brucellosis in animals, an attempt should be made to eliminate this disease rather than control it. In America its incidence in cattle has been reduced until now approximately 4% of cows are affected. Surveys indicate that 2% to 3% of swine are affected. In Colorado it is estimated that 1.5% of goats are affected with *Brucella melitensis*. Elsewhere information in regard to goats is inadequate. The author states that *Brucella suis* was identified as the cause of several epidemics of undulant fever traced to udder infections in cows. *Brucella melitensis* has been identified in cattle and swine on rare occasions. Recently *Brucella abortus* has caused infections in swine. These discoveries are significant when an eradication programme is considered. Four procedures may be adopted. Firstly, the herd is tested and cows with positive reactions are slaughtered. This may be combined with calf vaccination or not. This method has eradication of the disease as its immediate goal and should be used when the incidence is low and herds are self-contained. Secondly, the herd is tested and calves are vaccinated, but reactors are temporarily retained in the flock. The third procedure is calf vaccination without herd testing, and the fourth is adult vaccination alone.

The shortage of trained personnel is still a serious obstacle to rapid advancement of brucellosis eradication. From the results of continuing research on the "A.B.R." or ring test, there are prospects that this procedure will eventually prove to be a valuable adjunct to the blood agglutination test. It is estimated that counties having moderate to low infection can be ring-tested for about 10% of the cost of blood-testing in the same areas. This mainly reflects savings in man-hour requirements. Everyone is hopeful that further research will confirm earlier results and will provide the additional information needed to evaluate the test conclusively. With the recognition of relatively wide-scale interspecies transmission of *Brucella* types, it becomes more important than ever that all susceptible livestock groups be given serious consideration in the brucellosis eradication programme.

Public Health Aspects of Water Fluoridation.

H. HILLEBOE AND D. AST (*American Journal of Public Health and The Nation's Health*, November, 1951) discuss the part of fluorine in the prevention of dental caries. From investigations already carried out in different parts of America they conclude that water fluoridation represents a significant advance in public health practice. They state that by a relatively simple procedure of controlling the fluorine concentration of potable water at the optimum concentration of one part per million, it may be possible to reduce dental caries by 60% to 65%, and, together with current dental practice, to reduce tooth mortality from caries almost to the vanishing point. This new technique can be accomplished at the relatively low *per capita* cost of five to fifteen cents per year. The administration of this programme presents no serious problem, but it does impose on the health officer the responsibility for general supervision over the fluoridation process. Adequate control involves of the following measures: (i) adequate treatment equipment to ensure accurate dosing; (ii) qualified water treatment operators; (iii) provision for the safety of operators against fluoride dust inhalation; (iv) provision of satisfactory laboratory facilities and qualified laboratory personnel to determine the concentration of fluorine in the raw and treated water. The authors comment that public health dentists and sanitary engineers working together have provided another milestone in the control of disease in man. By forthright action, the public health officer can move forward in effectively implementing this programme, so that our next generation of children may approach adulthood with a full complement of teeth.

Choice of Fluoridating Agents in the Control of Dental Caries.

C. HOWELL, L. BURNBY, H. DAY AND J. MUEHLER (*American Journal of Public Health and The Nation's Health*, January, 1952) discuss the use of fluorine compounds in the prevention of dental caries. They refer to data and experiments which indicate that the topical application of a 2% solution of sodium fluoride will reduce the incidence of decay in children aged seven to seventeen years by 40%. A

fluorine level of one part per million occurring naturally in a communal water supply will reduce the incidence of decay in children of this age group by 60% to 65%. When sodium fluoride is used as the fluoridating agent of a communal water supply, the incidence of decay among children drinking the water from birth is reduced by 60% to 65%. The rationale of fluoride prophylaxis is based on the fact that where the element occurs "naturally" in water in sufficient amount, there is a concurrent reduction in the incidence of dental decay. Animal experiments with rats and hamsters indicate that other fluorine compounds are more effective than sodium fluoride; for example, tin fluoride proved to be 50% more effective than sodium fluoride in reducing the incidence of caries in hamsters. On the other hand, lead fluoride failed to reduce the incidence of human dental caries when applied topically. The authors stress the fact that there is insufficient evidence at the present time to justify the use of any fluoride compound other than sodium fluoride, except on a study basis, as the fluoridating agent of a communal water supply.

Infantile Diarrhoea and Escherichia Coli.

E. NETER, C. WEBB, C. SHUMWAY AND M. MURDOCK (*American Journal of Public Health and The Nation's Health*, December, 1951) report their observations on the presence of certain serotypes of *Escherichia coli* in a number of cases of infantile diarrhoea. They state that two serotypes of *E. coli* (0111 and 055) were recovered from the faeces, the naso-pharyngeal regions and the throats of a large number of infants suffering from infective gastro-enteritis in a number of outbreaks. The disease has not yet been experimentally reproduced in a suitable host by these organisms. Epidemiological, clinical and bacteriological data presented show that contact with and multiplication of these types of *E. coli* may be followed by an attack of diarrhoea, indicating that these organisms may be considered as the cause of this disease. Infants may be carriers of these types of *E. coli* without a history or evidence of diarrhoeal disease. These types of *E. coli* have been recovered from the upper part of the respiratory tract in 11 out of 14 cases, a fact which indicates that the organism may be spread to other susceptible individuals like an airborne infection. All strains of these serotypes of *E. coli* tested were susceptible *in vitro* to the broad spectrum antibiotics "Chloromycetin", aureomycin and terramycin, were distinctly less so to streptomycin, and were essentially resistant to penicillin and bacitracin. Clinical use of aureomycin, "Chloromycetin" and terramycin partially suppressed or eliminated these serotypes of *E. coli* present in the intestinal tract and upper part of the respiratory tract. Concomitantly, there was clinical improvement. The evidence on hand indicates that these serotypes of *E. coli* may be closely associated with epidemic and sporadic diarrhoeal disease of infants, and that the new antibiotics are effective bacteriologically and clinically and may prove to be of real value in the management and control of epidemics which otherwise may be associated with a fatality rate of over 50%.

Special Articles for the Clinician.

(CONTRIBUTED BY REQUEST.)

XXV.

THE MANAGEMENT OF DIABETES MELLITUS IN GENERAL PRACTICE.

THE management of a patient suffering from *diabetes mellitus* presents few difficulties provided certain general principles are appreciated. However, before proceeding to consider any problems of treatment, it is desirable to review the incidence and symptoms of the disease and the methods of establishing a correct diagnosis.

Although no case of *diabetes mellitus* has been reported at birth, it can occur at any age thereafter. It is uncommon before the age of forty-five years, and in this period of life the sexes are equally affected. In later life it is more common and affects the female sex more often than the male. The influence of heredity is not fully determined, but some family history of the complaint can be elicited in one-quarter to one-third of all cases. There is suggestive evidence to support the view that the incidence of the disease is slowly rising throughout the world, and a recent estimate indicates that over 1% of the entire population of the United States of America is affected with diabetes.

Generally speaking, the symptoms of the complaint are more pronounced in the earlier years of life, when the disease may declare itself with dramatic suddenness. Intolerable thirst with polyuria and rapid loss of weight and strength may so reduce the patient's health and energy as to demand medical attention urgently. Such patients if not promptly treated may proceed to severe ketosis, coma and death. On the other hand, particularly in middle and later life, the symptoms may be insignificant and pass unnoticed until glycosuria discovered during a routine medical examination first arouses the suspicion of diabetes. On rare occasions severe symptoms can develop in the elderly, but more frequently the insidious lassitude and tiredness are neglected for many months and are regarded as the inevitable consequence of advancing years. Occasionally the tragic development of a complication, such as retinitis or gangrene may first direct attention to the underlying cause. The wide variation in symptomatology and in the course of the complaint lends support to recent suggestions that *diabetes mellitus* is not a single disease entity but should be regarded as a syndrome which may result from any one of several causes as yet unknown.

Despite the variations in symptomatology and in the mode of onset and course of the complaint, there is one common feature in all cases, and this is an elevation of the level of the blood sugar above normal limits. The presence of *diabetes mellitus* may be suspected from the patient's history or from the discovery of a reducing substance in his urine, but confirmation of the diagnosis can come only from the demonstration of hyperglycemia. It must never be forgotten that the presence of a reducing substance in urine revealed by any of the recognized chemical tests may be due to other substances than glucose. Even if it is due to glucose, if it is not associated with hyperglycemia, the glycosuria is not to be regarded as of significance. In a normal individual the level of fasting blood sugar should lie between 80 to 120 milligrammes per 100 millilitres. If a dose of 50 grammes of glucose is given by mouth and further blood sugar estimations are made, the subsequent rise and fall in values should not exceed 180 milligrammes per 100 millilitres (usually thirty to sixty minutes after the taking of the glucose) and within two hours the blood sugar should have returned to the fasting level. No glucose should be present in the urine passed during this test. Occasionally a higher peak is reached during the test and some glycosuria may occur, but if the blood sugar returns to the normal fasting level within two hours it is safe to say that diabetes is not present. At times the values obtained are all within normal limits and yet glycosuria occurs. Such a finding is considered to be due to an alteration in the reabsorption of glucose by the renal tubules. This condition, known as "lowered renal threshold", is of no significance and requires no treatment. It is not regarded as a precursor of diabetes. When the fasting blood sugar value exceeds the normal figure and when the peak of the curve rises excessively and the blood sugar fails to return to the normal fasting level

within two hours, a significant hyperglycemia is demonstrated and the diagnosis of *diabetes mellitus* may be made with confidence. There are two pitfalls, however, which must be avoided. The diet of the patient should not be restricted for some days before the test is made because it is possible to alter the response obtained by a previous carbohydrate starvation. The other point is that the result is likely to be influenced by a recent infection or by an endocrine dyscrasia or by pregnancy. In such instances if a suspicious result is obtained it is wise to repeat the test after an interval in order to determine whether the disturbance is permanent or merely temporary.

When the diagnosis is established it can be assumed that diabetes will remain with the patient for the remainder of his life. The number of instances in which an apparent remission or cure occurs is so small as to make any other attitude to the patient and his complaint quite unjustified. Treatment is obviously urgent in the severe case in a young person, but the middle-aged patient with mild diabetes presents a different problem. Frequently he does not feel ill and is inclined to adopt an attitude of "why worry about diabetes until it worries me?" It is one of the perplexing problems of diabetes that a considerable proportion of patients show evidence of arterial damage after the disease has been present for some years. Although the reason for this is unknown, the consensus of opinion favours the view that it is in some way related to persistent hyperglycemia and that the only possible means of preventing its occurrence is to maintain a proper control of the disease. In other words the purpose of treating the mildly diabetic middle-aged patient is to ensure as far as possible that in later life he will not be maimed by arteriosclerotic sequelae which can develop so insidiously. It is the duty of every physician to recognize this fact and to inform his patient of the possible penalties of neglect.

It is safe to assume that the diagnosis of diabetes in any patient, no matter of what age, will involve some change of dietary habits, and it is to a physician he will turn for advice. It must be emphasized that more will be achieved if each patient is studied as an individual problem rather than by treating the disease by rule of thumb. His mode of life and habits, his occupation and hours of work, and his individual likes and dislikes for food demand careful study before the final pattern of treatment is planned. In other words it is essential to treat the patient as well as his disease. Much gratuitous and nonsensical advice is often tendered by well-meaning friends, so it is well to explain what has to be done and why it is being done. Broadly speaking the aims of treatment of *diabetes mellitus* can be summarized under three headings.

1. The primary purpose of treatment is to abolish hyperglycemia and to maintain control so that, as far as possible, the blood sugar values are kept within normal limits. In other words the patient is told that his urine is to be kept free of sugar and he is taught the technique of one such test. The means available for achieving this object are two. The first is by some restriction of carbohydrate intake and the second is by the use of insulin. The details of such treatment will be dealt with later.

2. Whatever dietary restriction is imposed, it should have as its object the maintenance of the patient's weight at a proper level for his age and height. This means that the young wasted patient must be deliberately overfed and the obese middle-aged patient deliberately underfed until proper weight levels have been attained. Thereafter the diets are adjusted to keep the weight at a constant figure. If the patient is a child due allowance must be made for growth.

3. Whatever pattern of treatment is decided upon, whether it is by diet alone or by diet and insulin, it must be such as to be easily understood by the patient and to allow him to do his normal every-day work. The whole object of treatment will be defeated by prescribing conditions which are impossible of achievement. It is of fundamental importance for the patient to realize that he is not an invalid and that, apart from some dietary regulation with or without a daily dose of insulin, he is capable of living the same life as he has always done and of doing all the things he used to do. The parents of the diabetic child must appreciate that diabetes is no handicap and that the child must lead a normal school life and be permitted to do all the things that other children do.

Quite frequently the question whether a patient will require insulin is forced upon the physician as soon as the diagnosis is made. It is possible to reply to this in quite general terms. It has already been noted that the disease tends to be more severe in the earlier years of life and less

so in later life. It is a safe working rule to assume that if diabetes develops in the first two decades of life insulin will always be required to control the condition and it should be used without hesitation as soon as the diagnosis is established. If diabetes develops in the third and fourth decades insulin will almost certainly be required, and unless it is obvious in a very few weeks that the patient is responding to dietary measures, insulin should be given without delay. With diabetes developing in the fifth and later decades there is an approximately 50% likelihood that the condition will respond satisfactorily to dietary measures alone. It is advisable with patients in this age group to persist with a trial of dietary restriction for some weeks and to suggest the need for insulin only when it is obvious that diet alone has failed to bring the hyperglycemia under control.

The degree of dietary control which is necessary for any patient is determined largely by a process of trial and error. From time to time nomographic charts have been devised with the idea of helping to arrive at an appropriate allowance for a patient of a certain age performing certain work. These must be regarded as mere approximations. The optimal amount of carbohydrate relative to the protein and fat content is, in the opinion of world authorities, somewhere in the vicinity of 150 to 250 grammes per day. If it is decided to initiate dietary treatment alone, the initial diet should be regarded as a trial which will serve as a basis for future modification. Ideally, the patient should be instructed in the basic diet and taught the appropriate substitution of one foodstuff for another by a trained dietician. At the first interview the patient's individual likes and dislikes should be considered and, in so far as is possible, the diet planned according to his previous habits. It is desirable at this stage that all foods should be weighed because this teaches the patient the relative value of one food as compared with another. Quite soon, with the majority of patients, it is possible to give up weighing when familiarity with quantities has been attained. In a number of instances, in middle-aged patients, this will suffice to control the hyperglycemia. The patient is taught how to test urine and the results should be recorded and presented to the physician at subsequent consultations. Estimations of blood sugar will give a more accurate assessment of the effect of treatment. If the patient's weight remains at a satisfactory level and if urine tests become sugar-free and the blood sugar is found to remain within normal limits the condition can be regarded as being satisfactorily controlled. It is a wise precaution for such a patient to be reviewed three or four times *per annum* and to have blood sugar estimations made in order to ensure that control is being maintained. Where the services of a trained dietician are not available it is necessary for the physician to undertake the dietary education himself. A number of satisfactory manuals exist for this purpose, amongst which may be mentioned R. D. Lawrence's "Diabetic ABC" which in simple language and with numerous examples can be understood by most patients. Lawrence's line system of diet is probably the most satisfactory scheme for the practitioner who is called upon to treat only an occasional diabetic. In larger clinics, accustomed to handling numbers of patients, other forms of dietary restriction are used partly to suit the individual desires of the physician and partly because they are capable of modification to suit the individual requirements of patients.

To recapitulate an earlier statement, approximately one-half of all patients developing diabetes in middle life can be controlled by diet alone. For the remainder the decision to use insulin in any individual case will be determined by several factors—the age of the patient, the severity of symptoms, and in the middle-aged group failure to control the condition by diet. It must be remembered that treatment with insulin is a form of substitution therapy and that the dosage applicable to any one patient must be determined by that patient's response. It is obvious that the dose of insulin must bear a definite relationship to the patient's daily intake of carbohydrates. For this reason it is just as important for the patient to be trained in exact measurement of his food when taking insulin as it is when he is not. Attempts to allow the patient free diet and a fluctuating insulin dose, determined by the results of urine testing, frequently defeat the object of maintaining control of hyperglycemia. If at all possible, it is desirable to determine the patient's insulin dosage while he is under direct observation in hospital. The patient is not confined to bed and in fact is encouraged to be up and about and even to go to work, using the hospital as an hotel. Urine tests are made on the fasting urine, and on samples obtained after each meal and at bedtime. The patient is taught the care of a syringe and the technique of

measuring and injecting insulin. During the period of hospitalization the patient receives a visual education in quantities and substitutions of foodstuffs in the various meals which he receives. This period of "stabilization" is time well spent because it must be remembered that his dietary habits are being altered for the remainder of his life and that two or three weeks spent in education is not a waste of time.

Various preparations of insulin are available for use; the effects of which vary with the time of absorption. Regular insulin, the first to be introduced into practice, has a rapid action, the effectiveness of which is spent in eight to twelve hours after injection. For this reason it is obvious that if regular insulin is to be used alone it is necessary to administer it at least twice a day, before the morning and evening meals. Other preparations of insulin (protamine zinc insulin and globin insulin) have a longer time of action which extends over twenty-four hours. In some instances it is possible to maintain control with a single daily dose of one of these, but often it is found that the time of action does not properly correspond to the patient's hyperglycemia. So in recent years the use of extemporaneous mixtures of regular (fast) and protamine zinc (slow) insulins has been advocated with considerable success. It is quite easy to vary the fast or slow component to match the individual patient's needs. Treatment is commenced with an equal ratio of the two and, depending upon the effect, one or other component can be increased or decreased as required. The initial dosage of insulin varies with the patient, but is usually in the vicinity of 12 or 16 units of each type. These are mixed in the syringe and given as a single injection before breakfast. The dosage is then raised or lowered or the ratio of the two insulins altered until the urine tests become sugar-free. It is important to realize that physical exertion is likely to influence the patient's insulin requirements and that due allowance should be made for this on the patient's discharge from hospital and the dosage lowered if he is resuming strenuous physical work. Recently several ready-made insulin mixtures have been advocated such as Di-insulin and NPH 50. In these preparations the ratio of the components is fixed, and, while suiting some patients, they cannot be regarded as suitable for all. While in hospital, the patient should be educated in the symptoms and management of hypoglycemic reactions and instructed as to the immediate measures for their control. It is desirable that patients taking insulin should carry with them at all times some barley sugar or other rapidly absorbed carbohydrate to take at the first suspicion of a reaction. It is also a wise precaution for them to carry an identity card with name and address and details of insulin dosage. On discharge from hospital the patient is seen at frequent intervals until it is obvious that his condition is satisfactorily controlled and he is managing to lead a satisfactory diabetic life. Thereafter he should be reviewed every three or four months.

A serious problem which arises with diabetics, and particularly with those who are taking insulin, is what to do during illness, particularly if associated with anorexia or vomiting. It is of great importance to realize that such a situation is serious and potentially dangerous. Ketosis may develop within a comparatively few hours, and it is therefore imperative that the usual dose of insulin be continued, and if incapable of taking food the patient should be given sweetened fruit juice or some other easily assimilable carbohydrate food. It is a wise precaution to instruct every patient in the dangers of this situation and to provide him with a fluid diet for use in such an emergency. If vomiting continues the patient should be admitted to hospital forthwith and fluids administered intravenously. Paradoxically under such circumstances the insulin requirements of a patient often rise very considerably and it is customary to commence the administration of regular insulin every four to six hours in dosages which must be determined by urine tests or if possible by blood analysis. Neglect to initiate such measures promptly can result in the patient's passing into a typical ketotic coma with impending circulatory failure and death. At this stage every hour which elapses before treatment is instituted is of much importance. The insulin dosage has often to be increased many times and may have to be administered at hourly or even half-hourly intervals until evidence of clinical improvement is apparent. Fluid is given intravenously with due regard to the patient's dehydration. His requirements of salt and chloride, if biochemical tests are not available, can be estimated approximately by analysis of the urinary chlorides. Glucose can be given intravenously at this stage provided an adequate cover of insulin is given. At times such therapy results in a fall of the serum potassium level which is suspected by depression

of the respiratory rate, by an inexplicable failure to respond to therapy or by changes in the electrocardiogram. The administration of appropriate potassium salt either by mouth or intravenously will correct this deficiency. It is important to ensure that circulatory failure does not occur and frequent estimations of blood pressure and pulse rate must be made. If it is apparent that the circulation is failing, the intravenous administration of 200 to 400 millilitres of 1:8 N saline will usually counteract this tendency. When the patient's condition improves he is allowed to take food of such kind and in such quantity as he is capable of taking and the diabetic state is managed by a fluctuating dosage of insulin given three times a day; the amount being determined by the patient's urine tests and a knowledge of his previous insulin requirements. This plan should also be applied to a diabetic patient undergoing surgical operation, for his appetite, post-operatively, is likely to be capricious.

The diabetic patient subject to an elective operation of surgery used to be prepared with a dose of insulin and a drink of glucose four or six hours before operation. This procedure is not without some danger as it is possible for hypoglycaemia to develop post-operatively and to be confused with some surgical complication such as hemorrhage. In a previously well-controlled diabetic it is, in most instances, better to refrain from giving any insulin on the morning of operation and to deal with the diabetic condition post-operatively with a fluctuating dose of regular insulin in the manner already indicated.

In conclusion, unlike most of the chronic or incurable diseases which are encountered in practice, *diabetes mellitus*, if properly controlled, should not prevent a patient from living a full and useful life. Again, unlike most of the diseases for which medical advice is sought, it is necessary for the patient to know something about his complaint and to appreciate the reasons which underlie his treatment. The function of the practitioner is twofold: firstly to institute such measures as are appropriate to control the hyperglycaemia and secondly to educate and encourage the patient in the way to keep it controlled. The accomplishment of these objectives is rewarded by the satisfaction of seeing the diabetic patient living and enjoying a normal life.

EWEN DOWNIE,
Melbourne.

Medical Societies.

THE UROLOGICAL SOCIETY OF AUSTRALASIA.

THE fifth annual meeting of the Urological Society of Australasia was held in Melbourne from February 25 to 28, 1952.

Retiring President's Address.

DR. HAROLD MOORE (Melbourne) commenced his retiring president's address by expressing appreciation of the honour done to him in his election as president of the Society for the year which was ending. He took the honour not so much for himself as for the hospital and unit in which he worked. He had greatly appreciated the kindness and help which he had received from everyone during the year and the very friendly atmosphere of the present meetings. At the moment he felt that the greatest loss to the Society had been that, through Dr. A. C. Telfer's illness in the past year, they had been deprived of a contribution from him. Knowing Dr. Telfer's keenness and originality, and his very great interest in the Society and their specialty and the amount of thought he gave to them, Dr. Moore felt that missing an address from him was a very great loss.

Dr. Moore went on to say that it did seem to be worth while to consider the relationship of urology to other specialties, although the very limited time at his disposal must make such consideration very sketchy. Some of the related topics were obvious to all, such as the newer work in physiology, particularly that on water and salt balance, which had revolutionized the pre-operative and post-operative management of a sick patient. Similarly recent advances in anaesthesia had rendered the performance of difficult operations easier and the recovery of the patient much smoother and more rapid.

Dr. Moore said that he would like to spend just a little time on the relationship of psychiatry and orthopaedics to urology. Psychiatry was undoubtedly of importance, and, because of the various taboos and inhibitions associated with

the sexual functions and the fears thus engendered, did loom large in their specialty. In such cases patients were unsatisfactory in that their ideas were so fixed by the time the urologist saw them that it was frequently impossible to do anything for them, particularly if they had been subjected to unwise or needless surgery.

The history in such cases was all-important, though as a rule the patients could not or would not tell their real troubles. Most of them were like Lot's wife in that they would look back. They were very conscious of their misfortunes and the cruel blows fate had dealt them. The real problem was to get them to look forward. They must, of course, be thoroughly examined, as it was quite possible for them to have an associated physical lesion. If such a lesion was excluded they should be handed over to the psychiatrist. Cure must be very rare, but there was one example in a girl of seventeen years who had been sent for urological opinion by a general surgeon who could find nothing abnormal. Her only complaint was pain in the left loin of sudden onset and associated with frequency of micturition during the day. Physical examination, excretion urography and examination of the urine all yielded negative results. She came under the heading of those who did not give a true history. It was discovered almost by accident that immediately before the onset of her symptoms her boy friend, of whom her father did not approve, had committed suicide. She was handed over to the psychiatrist, who unearthed a number of other psychic traumata, and she was finally cured. Dr. Moore said that he called her cured because about four years later she returned as a happily married young woman to show her first-born infant; she then had a perfectly normal outlook on life and was free of all complaints. He shuddered to think what would have happened to her if they had not discovered her real complaint.

Dr. Moore commented that this girl was exceptional in that she was fundamentally healthy and had been overwhelmed by a sudden severe blow. The trouble with most of the patients of the type under discussion was that they had some personality defect and it was not possible to restore them to normal. Some of the defects could be prevented by better training in infancy and it was along those lines that progress would be made.

Dr. Moore went on to say that closely allied to some of these cases were conditions brought about by defects in posture. In his own mind he considered mental poise and bodily poise to be very closely related. At one stage he had done a good deal of work at the Children's Hospital and was interested in orthopaedics, and he would like to mention one or two points which he thought were of importance in urology, particularly in young people who were still at the stage at which their muscles could be trained. Stasis was an important factor in producing infections in the urinary tract. It was as they knew often due to a defect or pathological condition in the tract, but it could be due to faulty posture, and he would like to outline one or two points to illustrate this.

Good posture really meant putting and maintaining the body in a good mechanical or working position so that there was no strain on any muscle or group of muscles or on any ligaments or joints while the subject was standing at rest. Various ligaments were described as supporting the kidney, but actually they were not very important or very effective, and at best only constituted a second line of defence. The main factor was the maintenance of the intraabdominal pressure by the external abdominal muscles in association with a good posture or good body mechanics. In the erect position in good posture the abdomen was shaped like an inverted pear, depending for its shape on the abdominal wall and the spinal curves. The main abdominal organs—liver, kidneys *et cetera*—were in the roomy upper end beneath the well-raised diaphragm and protected by the lower ribs. The kidneys rested on a sloping shelf made more oblique by the configuration of the psoas muscles on either side. The downward force of all these abdominal organs was taken by the lower abdominal muscles.

In abnormal posture there were two main types of change. If abnormal lumbar lordosis was present, the posterior wall became more vertical, because of the increased tilt of the pelvis, and if the lower part of the abdomen was protuberant and its muscles were slack, the heavier organs sagged. Normally, the lower abdominal muscles took the counter-pressure of the diaphragm, but when they slackened they did not respond to the downward thrust of the diaphragm by producing a positive pressure in the abdomen. In the other type, in which there was slackness of the muscles of the upper girdle with increased flexion of the dorsal part of the spine, the increased flexion, by crowding the ribs together

and making their direction more oblique, reduced the capacity of the thorax. In both types the diaphragm tended to sink to a lower and lower level. This reduced the space beneath the ribs for the viscera, which then tended to be forced downwards, and there resulted such diverse effects as improper emptying of the stomach, chronic constipation, movable kidney and orthostatic albuminuria. Those were all visceroptotic phenomena, and any symptoms arising were due to the mechanical interference with the viscera concerned. The particular interest for the moment was in the effects on the kidneys. It would appear that in such cases many recurrent attacks of pyelitis were due to intermittent dropping of the kidneys with intermittent stasis, either giving rise to a fresh infection or reactivating one already present. The treatment in all such cases was rest in the first instance, then gradual training by exercises to maintain a good posture, so that the body mechanics were put on the soundest possible basis, and the strain necessary to maintain the upright position was reduced. The essential point was to straighten the back and strengthen the abdominal muscles. In young people such treatment could be very effective.

Closely allied to such postural cases was a smaller but very definite group in which attacks came on after a long motor ride or a train journey, and it would seem that the factors at work were very much the same. As these patients were forced to sit for long periods, their abdominal muscles simply sagged and the kidneys came down, with temporary stasis and a flare-up of an old or perhaps unrecognized infection. In those cases the absence of any changes in intraabdominal pressure, as a result of the cessation of muscular movements, was probably as important a factor as the ptosis. This type could be guarded against by frequent changes of position and if possible interludes in which a short walk was indulged in.

Dr. Moore said that he had endeavoured to indicate how some recurrent infections were kept going by interference with the mechanical working of the urinary tract by faulty posture. There was not time to indicate how some of those faulty postures might throw a strain on some particular muscle or group of muscles and thus give rise to pain and spasm of the muscles under stress. Many of the pains were referred to the lumbar region, and it was only by careful history and examination that they could be separated from a renal lesion.

In conclusion, Dr. Moore said that the purpose of his rather rambling remarks was to point out that although they must have the fullest knowledge of their speciality and the various special methods at their disposal for treating urological conditions, they should have a working knowledge of other systems. That enabled them to consider the patient as an individual and helped them to realize that other systems might be important in producing the symptoms of which the patient complained, even though the symptoms might be referred to one particular tract.

Office Bearers.

The following office bearers were elected for the year 1952-1953:

President: Dr. J. J. Power.

Past President: Dr. W. H. Moore.

Vice-President: Dr. C. M. Edwards.

Honorary Secretary: Dr. H. H. Pearson.

Honorary Treasurer: Dr. K. L. Kirkland

Members of the Executive: Dr. J. W. S. Laidley, Dr. A. C. Telfer, Dr. E. G. Maloney.

Urinary Calculus.

PROFESSOR E. S. J. KING (Melbourne) read a paper entitled "Urinary Calculus: Some Notes on its History and Mode of Formation" (see page 337).

Dr. M. S. S. EARLAM (Sydney) said that for the purposes of the rather difficult task of opening the discussion on such a very wide subject, which had already been exhaustively dealt with by Professor King, he thought that rather than to attempt any broad appraisal from the purely scientific viewpoint, it would be far preferable to discuss from the purely clinical point of view the formation of urinary calculi in one particular group of patients of paramount importance, namely, those patients who had previously had stones removed surgically. The problem of stone-formation was a major one, but the problem of recurrent stone-formation was one to which all too often no satisfactory answer existed, and in an operation for stone anywhere in the urinary tract it was necessary on every occasion to devote at least some thought to whether the surgical endeavours

would ultimately place the patient into that most difficult group.

The single ovoid calculus which required removal from kidney or ureter as the case might be, and was formed within an anatomically normal urinary tract, was not as a rule a major problem. Its formation and removal constituted an isolated adventure in the life of the patient, and whether or not he subsequently stuck rigidly to the mode of life enjoined upon him, non-occurrence appeared to be the general rule. At the same time it must not be forgotten that even though non-occurrence was the rule, any individual in the community was a potential candidate for calculus-formation, and by the law of averages some of the patients on whom one operated for calculus must of necessity grow further ones. For that reason Dr. Earlam felt most strongly that with this type of calculus there must be adequate indications for surgery over and above the mere presence of the calculus, before operation was carried out. He well remembered a colleague some years previously telling him of a patient of his in whom a renal calculus had turned up as an accidental discovery. Being convinced himself, he had convinced the patient also that operation was in his best interests, and the patient had reluctantly gone ahead. Six months later he was back where he started with another stone. If the patient had previously had symptoms calling for surgery, he would have forgiven his surgeon, but as things were he was more than a little disgruntled. The surgeon also was in rather a quandary. If he advised the patient to carry on, he admitted that his initial advice was incorrect and the operation unnecessary; while if he advised further surgery, was the same situation going to recur a third time six months or so later? Thus, Dr. Earlam said, he firmly believed that the presence of a stone was not *per se* an indication for surgery.

After surgery the question arose as to what instructions should be given to patients to help them to avoid recurrence. In the almost invariable presence of uninfected urine of normal acidity, Dr. Earlam's own feeling was that little useful could be done beyond maintaining an adequate fluid intake, but even so a man of forty years who formed his first stone at that age would probably never form another. Dr. Earlam said that probably they all placed a few dietary restrictions on their patients, though he personally could hardly see how an occasional three or four sticks of asparagus, or an occasional modest serving of spinach, could reasonably be expected to precipitate the formation of another stone. However, patients expected it, and if stone-formation did recur they felt that anyway the surgeon had done his best.

A second type of stone that usually occurred in a urinary tract that was to all intents and purposes anatomically normal was the staghorn calculus. Depending on one's approach to the condition, it might be either a major surgical problem or no problem at all—no problem at all if one believed in the principle of nephrectomy or nothing, but a major problem if one belonged to the school that considered that these calculi should be removed if there were any reasonable prospects at all that the procedure might be technically feasible. Dr. Earlam said that for a long time he personally had avoided operation on patients with staghorn calculus, but some seven or eight years before, after reading an article from the Mayo Clinic in which surgery was advocated as being far preferable to leaving the patient to certain death within ten years, his conscience had started to trouble him and he had operated on a small series of patients in whom the prospects of surgical cure appeared rather less remote than usual. The stones without exception had recurred rapidly and extensively, the only difference being that in one or two cases a cell-free urine was replaced by an infected one. Dr. Earlam said that he could lay claim, he hoped, to a surgical technique of average adequacy, but on one occasion, despite the assistance given by X-ray examination of the kidney on the loin, he had been quite unable to locate a stone fragment of appreciable size in a large solitary meaty kidney, and had perforce left it behind. The patient, a milk carter, had remained well and asymptomatic despite the rapid growth of the fragment to a huge staghorn stone.

Dr. Earlam went on to say that he thought that it was not always appreciated how little renal tissue was necessary for normal well-being, and it was very much a moot point whether one should attempt an extensive nephrolithotomy at the cost of destroying a number of nephrons, or do nothing and conserve what nephrons there were. His feeling at present was that at all events in the hands of the average surgeon the chances of recurrent stone-formation were so enormous that operation should in general be avoided for stones of the staghorn type.

One patient in this category was of more than usual interest. He had bilateral stone, and twenty-three years previously, at the age of twenty-four years, had had a right nephrolithotomy by Mr. Gordon Craig. Dr. Earlam had seen him nine years later, in 1938, when he had X-ray films taken that he showed to the meeting. The right kidney was quite functionless, while the left had some function of very limited degree. The blood urea content was 45 milligrammes per centum, and the urea concentration to a maximum of 1%. Dr. Earlam had examined him again during the week before the meeting, when his urinary tract was as seen in the X-ray films shown. The blood urea content now was 20 milligrammes per centum and the urea concentration to a maximum of 1.15%. He drove a taxi. Obviously operation had achieved nothing for this man, and it might have been responsible for the loss of function in his right kidney.

Dr. Earlam said that on rare occasions one saw the formation of calculi inhibited, or even put into reverse, by attention to the pH of the urine. He went on to say that one final consideration he would like to mention as having a bearing on recurrent stone-formation was the presence of urinary obstruction. His listeners all knew the old principle that no treatment of stone was complete without treatment of any obstruction that existed below, and conversely that if the obstruction was dealt with the stone should not recur, but those things just did not seem to work out. Quite recently he had examined a man of seventy-one years, whom he had first examined in May, 1947. The patient had then had a trilobed prostate with no less than five vesical calculi. He had a responsible position and was not prepared to accept any surgery that was not absolutely necessary, so had just taken a couple of days off and had had his stones crushed. Some six weeks before the time of the meeting he had returned with painless hæmaturia, which turned out to be associated with his adenomatous prostate, which he proposed to keep. There was no sign of calculus.

So far as the upper tract was concerned, Dr. Earlam said that his own experience was that calculus-formation secondary to obstruction was comparatively rare, and when it occurred he felt that the results of an operation were a little bit in the lap of the gods. The case of one most interesting patient, first examined in 1946, might be worth reporting. She had had a history of one attack of renal colic. Despite the huge stones present in her X-ray film, Dr. Earlam had seen no occasion to rush her into surgery, but nine months later she had developed pyuria, which cleared up only temporarily with sulphonamides. For that reason Dr. Earlam had then advised surgery and combined removal of the stones with a Foley's operation. The post-operative X-ray film showed quite a nice result of the Foley's operation, but unfortunately the patient now had not two stones but four. Her urine was clear and she was asymptomatic; thus, so far as Dr. Earlam was concerned, she could keep them.

In conclusion, Dr. Earlam remarked that as he had said before, he thought that it did pay not to interfere surgically in cases of stone without just cause, as the future in respect of stone-formation was completely unpredictable; extensive though their knowledge of the subject might be, large gaps still remained. At times the gaps loomed so large that, unscientific though it certainly was, and wrong though it might be, it almost appeared as if the patient's fate as regards recurrent stone-formation after surgery was decided by a benevolent providence or a malignant fate as the case might be.

The Treatment of Ureteric Calculi.

Dr. G. R. DAVIDSON (Ballarat, Victoria) read a paper entitled "The Treatment of Ureteric Calculi" (see page 840).

Anatomical and Pathological Considerations in Prostatectomy.

Dr. DOUGLAS B. DUFFY (Melbourne) read a paper entitled "Some Anatomical and Pathological Considerations in Prostatectomy" (see page 842).

Gram-Negative Bacilli in Urinary Infection.

Dr. E. W. KYLE (Perth) read a paper entitled "Gram-Negative Bacilli in Urinary Infection" (see page 845).

Chyluria.

Dr. PETER ROW (Brisbane) read a paper entitled "Chyluria" (see page 847).

Dr. PAUL HOPKINS (Mackay, North Queensland) congratulated Dr. Row on his paper. He said that filariasis was undoubtedly on the decrease in the north. He had encountered quite a number of cases at the hospital approxi-

mately twenty-five years before and also quite a number in private practice. Townsville and its surrounding districts had always been regarded as rather a hotbed of filaria, and in quite a number of his cases the patients had been infected in Townsville. The affected area was mostly the limbs and nearly always the leg and scrotum. Chyluria was common and was treated mostly, he had to confess, by reassurance with surprising success, although in some cases recovery took quite a time; there was occasional loss of weight, but no other serious symptoms occurred. Dr. Hopkins said that he had attempted some investigation, but he had only an old Wolf cystoscope and a small coil X-ray plant with gas tubes; so the results were all negative.

The onset of the disease was almost always the same, with high fever (103° to 104° F.), headache and malaise, and the patient looked and felt really ill; usually swelling and tenderness of the glands were present, and within a day or two the affected limb would swell with pitting oedema. The limb was painful and tender, often redness and lymphangitis appeared, and at times the condition could be confused with erysipelas or the brawny oedema of the cellulitis of the early days; in such cases, Dr. Hopkins felt sure, the patient had an added streptococcal infection. Occasionally the swelling and pain extended to the scrotum.

Dr. Hopkins said that he had not seen a case in which chyluria occurred at the onset; occasionally it would appear after a few weeks, and now and again in a chronic case. The enlarged thickened scrotum was present in chronic cases occasionally; he had seen a few large enough to make it necessary to wear a support, but none of the huge scrotums of the text-books. After the attack the swelling would go, and often it appeared only after a heavy day on the feet. The attacks would recur every few weeks or months, each attack being a little less severe and leaving a little more swelling. Dr. Hopkins said that the diagnosis was usually easy after a few cases had been seen. He took many blood slides (midnight was his time), but he could only occasionally demonstrate the parasites. There was no pathologist available and there was little equipment. That would explain his lack of success and also why he was unable to demonstrate the parasites in chyluria; it was not as easy as it sounded in the text-books.

The treatment was symptomatic. With a first attack the patients were usually laid up for a week or two; with later attacks they frequently looked after themselves. Dr. Hopkins said that he had treated the chyluria with urinary disinfectants, but he did not think that they had any effect. "Hetrazan" had been announced in 1947 and had been fairly widely used in filaria-affected countries with considerable success. The dose varied from 0.5 to 2.0 milligrammes per kilogram of body weight one to three times a day. Manson-Bahr quoted a series treated three times a day for seven days with a 96.9% reduction of microfilaria. Muzzotti and Hewitt recommended a dosage of two milligrammes per kilogram of body weight three times a day for twenty-one days, starting with one-third of the dose on the first day, two-thirds of the dose on the second day, and the full dose on the third day. If severe allergic reactions occurred, one must stop for four days. Biopsy showed that the adult worms were unaffected, but a large number of microfilaria were destroyed. Apparently the "Hetrazan" did not directly destroy the microfilaria, but altered them so that the phagocytes could destroy them. Dr. Hopkins said that he had seen one patient who had had "Hetrazan"; it was a very unsatisfactory case, but he would give the patient's history. He had known the patient for twenty years, during which he had recurring filariasis and occasional attacks of chyluria. Those cleared up with simple treatment, but even after twenty years the patient still had fairly severe attacks, which laid him up for about a week or ten days with a temperature of 103° F. His left leg was the part affected; he could in the intervals go about his work as a ship assistant. In 1950 Dr. Hopkins read of "Hetrazan" and told the patient about it, but could not get any. The patient had an attack early in 1951, but "Hetrazan" was still not available. In June, 1951, Dr. Hopkins saw him. He was unconscious and had a temperature of 101° F., his reflexes were equivocal, but his left leg looked better than Dr. Hopkins had ever seen it look; the skin was far healthier in appearance, and the usual swelling was greatly reduced. The patient's wife told Dr. Hopkins that the patient had got hold of some "Hetrazan"; she did not know what dose he was taking, but he had taken it for two or three months. Dr. Hopkins said that he thought that the patient might have a severe Herxheimer reaction, but he turned out to have a cerebral hæmorrhage and was left with aphasia and agaphria; consequently it was still not known what dose he took. He had had another stroke three months later and died.

There was no doubt about the great clinical improvement in his leg. Dr. Hopkins said that he would, of course, like to try "Hetrazan" in a fresh case, but they were very few and far between nowadays. Before the advent of "Hetrazan", sending the patients to a cold climate was the best cure Dr. Hopkins had known. He had had no experience of the other types of chyliuria.

Plain Radiography in Intestinal Obstruction.

DR. EDGAR REAY (Christchurch, New Zealand) discussed the question of plain radiography in intestinal obstruction. He said that among elderly patients in uræmic or semi-uræmic states a paralytic type of abdominal distension was common. When a mechanical intestinal obstruction occurred in these people its recognition might be difficult. In such cases barium techniques were not easily applied, and great help could be obtained from plain radiography of the abdomen—a simple procedure which could be applied at the bedside of an ill patient.

The basis of the test was that gas plus fluid accumulated in the bowel above a mechanical obstruction. With the subject in the erect posture the association of gas and fluid gave rise to a series of fluid levels. The supine film showed the amount and distribution of the gas in the bowel. The pattern and size of the distended loops confirmed the presence of obstruction and indicated its site. In the normal person there was a gas bubble in the stomach, but the small bowel did not contain sufficient gas to show on a film. The large bowel usually contained air in widely differing amounts. During a prolonged examination gas might appear in the small intestine and increase in the large bowel owing to air swallowing. That was often well seen during intravenous pyelography.

The contents of the small bowel were viscous though liquid, and fluid levels rarely appeared in health. The lumen was small and ribbon-like. In the colon, in spite of its width, fluid levels were rare. The contents were seldom voluminous or fluid enough to gravitate freely to the dependent loops when the patient was erect.

In obstructive states absorption of water and gas from the gut diminished and an excessive amount of dilute secretion was poured out. Fluid and gas separated readily, and fluid levels appeared when the subject was in the erect position. In number they increased with the duration of the obstruction and its lowness in the small bowel. Distension was greater in the ileum than in the jejunum, as vomiting often emptied the upper loops.

When the colon was obstructed, especially if it was short without sagging loops, there might be only one or two fluid levels. The degree of distension of the colon depended on the competency of the ileo-caecal valve. If it became incompetent a backflow of gas was allowed into the small bowel, which might become distended enough to obscure the colon. The typical cross-striated pattern of the jejunum was well known. In the lower part of the ileum the *valvulae conniventes* were smaller and fewer, and when the bowel was distended they might become invisible, and the bowel patternless. The haustrations in a distended colon were characteristic and imparted a wavy outline to the bowel. From the troughs of the waves transverse lines crossed the bowel at irregular intervals completely differing from the more symmetrical arrangement in the upper small gut. The pelvic colon when distended often lost those special features and appeared as a smooth-walled tube and resembled terminal ileum. The descending and pelvic parts of the colon did not distend readily, and this lack of filling might lead to the siting of the block at too high a level. Inspissated faeces displacing gas above the obstruction might lead to the same error.

In the group of distensions associated with uræmic states with which they were more familiar, the large bowel only was affected and there were no fluid levels. Abdominal distension associated with renal colic was another relatively common group of interest to urologists. That also affected the large bowel and clinically might cause confusion with mechanical obstruction.

Dr. Reay said that between the three groups mentioned there were paralytic ileus and the ileus associated with peritonitis. The bowel contents soon became fluid, and gas and fluid levels appeared in both small and large bowel. Peristalsis was absent and the picture tended to remain stationary, whereas in cases of mechanical obstruction there was active peristalsis and the picture tended to change in a few hours.

The great difficulty in diagnosis arose in the case in which it was probably most urgent—that of the patient with a strangulated or incarcerated loop of small bowel. The

findings might be scanty; there might be a few dilated prestenotic loops.

Dr. Reay went on to describe the technique. He said that no enema should be given before the examination, as retained fluid might give rise to false fluid levels. Two films were taken of the abdomen, one with the patient supine and one with the patient erect. If the patient was too ill to stand erect a sitting posture might suffice or the patient might be turned on one side. Large films were necessary, and in some cases as the diaphragm was elevated centring should be a little above the usual. In cases of obstruction fluid levels began to appear in about four hours, and the lower the obstruction was in the small bowel, the sooner would fluid levels appear. If the result of the examination was inconclusive it might be repeated at intervals. Intestinal obstruction was a progressive condition and the picture would show a continual change in the distribution of gas and fluid levels.

Dr. Reay then outlined the case histories of three patients who had been admitted to a urological ward; one had intestinal obstruction plus urinary retention, and the other two had developed mechanical obstruction during their convalescence. He illustrated them with a series of X-ray films.

The first patient, a man, aged eighty years, had a long history of difficult urination and two days before his admission to hospital had been seized with right lower abdominal colic followed by vomiting and then retention of urine. His tongue was dry and brown, and his skin hard and dry. The abdomen was distended, but most of his pain seemed to be due to the full bladder. His prostate was soft but very large, and a catheter could not be passed. His general condition was very poor, so a single stab cystostomy was performed and the bladder decompressed. At that time the total non-protein nitrogen content of the blood was 88 milligrammes per centum, the plasma chloride content was 450 milligrammes per centum, and the carbon dioxide combining power was 75%. Intravenous therapy was started to improve his fluid intake to restore the chloride loss and to remedy the alkalosis. No bowel sounds were heard in the abdomen. The previous abdominal pain was thought to have been due to ureteric reflux and the distension to uræmia. By the third day the urine output had increased and the blood values had almost returned to normal, but vomiting was continuing and abdominal distension with absent bowel sounds persisted. Enemas relieved the distension temporarily. The report on a plain radiograph stated: "Two gas distended loops of small intestine are demonstrated in the mid abdomen." Little notice was taken of this report and with gastric suction and intravenous fluid therapy treatment was continued. It became clear that bowel function was not responding to an obvious improvement in renal function. Although bowel sounds were still absent, the material from gastric suction became faecal and the X-ray examination was repeated; the gaseous distension of the small bowel was much more pronounced. The condition was obviously a mechanical obstruction, and at operation a volvulus of the terminal part of the ileum was found under a band. This was relieved, and the patient recovered. Dr. Reay pointed out that he and his colleagues were not alone in their mistaken diagnosis, as the old man had been examined several times in consultation by a general surgeon. He was not at any time fit to go to the department for radiological study, and if more attention had been paid to the single bedside plain radiograms much time and suffering might have been avoided.

The second patient, a man, aged sixty-seven years, had a long history of urinary dysfunction, but with no history of bowel disturbance. Prostatic resection was performed for a small simple hyperplasia. A mild urinary infection followed, but by the tenth day he was ready for discharge from hospital when suddenly he had colicky lower abdominal pain and vomiting. The bowels had not moved during the previous forty-eight hours. Vomiting of bile-stained stomach contents followed with abdominal distension. The findings of rectal examination were negative, and there were active and loud bowel sounds. An enema produced a flatus result only. A plain X-ray picture of the abdomen was taken with the following report: "There is marked gaseous distension of the large intestine including the descending colon with a mass of faeces apparently filling the caecum. Fluid levels are present in the erect position. The appearances are very suggestive of a large gut obstruction in the region of the sigmoid colon." Regular enemas were then given to decompress the large bowel, and gastric suction and intravenous fluid therapy were commenced. Four days later the X-ray examination of the abdomen was repeated, and although the mass of faeces had disappeared, there was again pronounced

gaseous distension of the large intestine. Transverse colectomy was performed for a carcinoma of the sigmoid colon.

The third patient, a man, aged eighty-one years, had been admitted to hospital with retention of urine. He had a history of several previous attacks of abdominal pain associated with constipation and vomiting. Seven days after retropubic prostatectomy he had severe abdominal pain, mostly about the umbilicus. There was no vomiting, but abdominal tenderness and distension soon followed. There had been no bowel movement for forty-eight hours, and he was unable to pass flatus. The following report was supplied on a plain X-ray examination of the abdomen: "There was gross gaseous distension of the large intestine and particularly of a large sigmoid loop, very suggestive of sigmoid volvulus." A barium enema was obstructed at the recto-sigmoid junction. At operation a grossly distended sigmoid volvulus was found. As the patient's condition was poor, a rectal tube was passed into the transverse colon after the looped volvulus had been undone and was allowed to remain. He made a satisfactory recovery.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

LIVERPOOL HOSPITAL.

James Bowman, Esq.
Sir,

Colonial Secretary's Office,
Sydney, October 30, 1833.

Having submitted to the Governor your letter of 26th instant requesting that ALEXANDER McDONALD of the Medical Profession now on Board the Lord Lyndock may be appropriated to Liverpool Hospital—I am directed by His Excellency to acquaint you that the dire consequences of employing a convict Medical Man at Liverpool Hospital were so plainly demonstrated at a late Trial in the Supreme Court that he will never permit another to be sent in a similar situation to any Hospital in the Colony.

I have, &c.,

T. C. HARRINGTON.

Naval, Military and Air Force.

APPOINTMENTS.

THE following appointments, promotions et cetera are promulgated in the *Commonwealth of Australia Gazette*, Number 38, of May 29, 1952.

NAVAL FORCES OF THE COMMONWEALTH.

Citizen Naval Forces of the Commonwealth.

Royal Australian Naval Volunteer Reserve.

Appointment.—Leonard Hugh Catchlove is appointed Surgeon Lieutenant, with seniority in rank of 21st August, 1947, dated 4th March, 1952.

AUSTRALIAN MILITARY FORCES.

Royal Australian Army Medical Corps.

Major-General Sir S. R. Burston, K.B.E., C.B., D.S.O., V.D., Retired List (3rd Military District), Australian Military Forces, is appointed Honorary Colonel of the Royal Australian Army Medical Corps, vice Lieutenant-General Sir J. Goodwin, K.C.B., K.C.M.G., D.S.O., Retired List, British Army, 5th May, 1952.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force.

Medical Branch.

The resignation of Flight Lieutenant E. C. Hey, D.F.C. (028024), is accepted, 30th June, 1952.

¹ From the original in the Mitchell Library, Sydney.

Air Force Reserve.

Medical Branch.

The following officers are promoted to the rank indicated, 1st April, 1952: (Temporary Group Captain) Temporary Wing Commanders I. B. Jose, M.C. (1851), I. G. McLean (251178), L. E. Hurley (2075), J. J. W. Flynn, M.C. (261268); (Temporary Wing Commander) Temporary Squadron Leaders T. G. Millar (2081), K. A. McLean, M.C. (1698), H. C. Finn (2079), V. N. B. Willis (2872), L. R. Flynn (263940), E. V. W. Pockley (3752), G. G. Burniston (261263), B. J. Mulvany (251258), J. B. G. Gibson (277428), D. H. Le Messurier (282721), A. M. Johnson (267741), S. M. Morson (262063), E. F. Langley (252868), B. N. O. Colahan (3225), H. H. Harrison (7270), G. M. Tallent (257739), T. C. Anthony (297497), L. D. Walters (277535), S. B. Forgan (281237), C. Roe (011370); (Temporary Squadron Leader) Flight Lieutenants M. B. Clarke (253717), D. F. O'Brien (253180), E. D. E. O'Brien (257096), W. G. Norman (283250), G. A. Robbie (256365), C. R. Laing (253407), D. F. Buckle (033452), B. T. Glanville-Hicks (257775), M. C. Moore (287472), P. A. Rogers (267886), B. E. Frecker (267894).

The following former officers are appointed to commissions with rank as indicated: (Flight Lieutenant (Temporary Squadron Leader)) A. J. M. Dobson (252289), 18th February, 1952; (Flight Lieutenant) G. J. Ramsay (265308), 11th February, 1952.

The following are appointed to commissions with the rank of Flight Lieutenant: Edward Douglas Johnston (277598), 28th February, 1952, Hugo Ulrich Herbert Von Alpen (277599), 17th March, 1952.

Congress Notes.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

THE Executive Committee of the Eighth Session of the Australasian Medical Congress (British Medical Association), to be held at Melbourne from August 22 to 29, 1952, has sent the following information for publication.

Quiz Sessions.

Amongst the combined sessions to be held on the first two days of Congress will be one on "Hypertension" under the chairmanship of Professor E. S. J. King, at which the speakers will be Dr. F. B. Byrom, Dr. Alex Murphy, Dr. I. Douglas Miller, Dr. Kevin O'Day, Dr. R. H. Orton and Dr. A. J. Barnett.

Speakers at the second panel session, on "A Review of the Antibiotics", at which the chairman will be Dr. Edgar Thomson, are Dr. P. L. Bazeley, Dr. S. Williams, Dr. Alan E. Lee, Dr. A. M. Hill and Miss Jean Tolhurst.

An invitation is issued to intending members of Congress to forward to the Assistant General Secretary at Congress Office, 426 Albert Street, East Melbourne, details of any particular aspects of either of these two subjects they would like to hear discussed. Members of the panel in each case feel that such information may aid them in their preparation of the subject, but they cannot guarantee that every aspect submitted will be discussed.

Congresses.

THE AUSTRALIAN AND NEW ZEALAND ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The Australian and New Zealand Association for the Advancement of Science will meet in Sydney from August 20 to 27, 1952. The following information about Section I (Medical Science, National Health and Microbiology) and Section N (Physiology and Biochemistry) is supplied for those interested in the basic medical sciences.

Section I: Medical Science, National Health and Microbiology.

All meetings of Section I will be held at the School of Public Health and Tropical Medicine.

The President of Section I, Dr. E. V. Keogh, will deliver his presidential address on the subject "Virulence and Infectivity of Organisms" at 11.15 a.m., Wednesday, August 20.

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Public health papers will be read on Thursday and Friday afternoons, August 21 and 22.

On Thursday, Dr. N. F. Goldsworthy will speak on fluoridation as a public health problem. Dr. H. O. Lancaster will compare rubella deafness experience in various countries. Dr. M. S. Marples will discuss yaws transmission, and Mr. R. H. Leach and Professor F. Fenner the pathogenicity of *Mycobacterium ulcerans*.

On Friday, Dr. R. J. Walsh will talk on the result of his haemoglobin survey in New South Wales and on public health aspects of the Rh factor. Mr. N. F. Stanley will discuss the Coxsackie virus in New South Wales, Mr. C. G. Ludford the incidence of *Escherichia coli* "O" 111 in gastroenteritis, and Dr. R. H. Black malarial epidemiology in New Guinea.

In the subsection of microbiology, industrial applications (yeasts, sulphur bacteria and rhizobia) will be discussed on the morning of Friday, August 22.

A symposium on Monday, August 25, is devoted to viruses, and will be followed in the afternoon by a discussion on host-virus relationship.

The physiology of microorganisms is the subject for the morning of Tuesday, August 26. A joint session with Section D on myxomatosis will be held on Tuesday afternoon.

On the final morning, that of Wednesday, August 27, the ecology of microorganisms and the teaching of microbiology will be considered.

Dr. R. H. Black and Dr. H. O. Lancaster are the Honorary Secretaries of Section I. Dr. Phyllis Rountree is Secretary of the Subsection of Microbiology.

Section N (Physiology and Biochemistry).

The presidential address to Section N will be given by Professor N. L. Edson, of the Otago Medical School, on "The Metabolism of the Sugar Alcohols".

Professor C. H. Best, F.R.S., will speak on "Factors Affecting Fat Mobilization".

Half-day sessions will be devoted to original papers on endocrine and reproductive physiology, protein chemistry, electrophysiology, fluid and electrolyte balance, and cardiovascular physiology.

The local committee would still be glad to receive offers to demonstrate small apparatus or to display experimental results by means of charts, photographs or diagrams at a conversazione to be held during the meeting. Intending exhibitors should inform the Honorary Local Secretary of Section N, Dr. W. J. Simmons, Kanematsu Memorial Institute of Pathology, Sydney Hospital, before August 6, stating the nature of their exhibit and any facilities, for example, microscope, which they may require.

Membership and Enrolment.

The ordinary membership fee, entitling the member to attend any Section or general function at the 1952 meeting, is £1. Enrolment forms may be obtained from Mr. J. M. Vincent, Local Secretary, School of Agriculture, University of Sydney.

Obituary.

HERBERT CLEMENT FINN.

We are indebted to Dr. L. J. Woodland for the following appreciation of the late Dr. Herbert Clement Finn.

Herbert Clement Finn came from Canowindra and was educated at St. Stanislaus College, Bathurst, and the University of Sydney. He was associated, firstly as a player and later as an administrator, with the Sydney University Amateur Rugby League Football Club throughout its existence. He was a very elusive half-back, who, in the opinion of many competent judges, lost chance of international recognition by unselfishly playing out of position for his club.

After graduation he was a resident medical officer at Lewisham Hospital and then proceeded to England, where he remained for several years studying the treatment of venereal diseases.

He was an honorary medical officer for venereal diseases at the Royal Prince Alfred Hospital for many years, and, at the time of his death, was the senior honorary medical

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED MAY 24, 1952.*

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	2	..	..	..	2
Amoebiasis	1	..	..	..	1
Amoebic Dysentery	1	..	..	..	..	..	1
Anthrax
Bilharziasis
Brucellosis ..	1(1)	1(1)	1	..	..	..	..	..	3
Cholera
Chorea (St. Vitus)
Dengue
Diarrhoea (Infantile)	9(6)	..	1(1)	..	..	..	10
Diphtheria ..	10(5)	8(5)	9(3)	..	..	..	..	..	27
Dysentery (Bacillary)	16(12)	3(3)	2(2)	..	..	..	21
Encephalitis	1	..	..	1
Filariasis
Homologous Serum Jaundice
Hydatid	1	..	..	..	..	..	..	1
Infective Hepatitis	16(5)	..	1	..	17
Lead Poisoning
Leprosy
Leptospirosis	1	..	..	..	..	..	1
Malaria	1	..	..	..	..	..	1
Meningococcal Infection ..	1(1)	3(1)	..	1(1)	..	4(2)	1	..	10
Ophthalmia
Ornithosis
Paratyphoid
Plague
Poliomyelitis ..	8(3)	8(5)	3(1)	7(1)	..	..	1	..	27
Puerperal Fever	1	..	..	..	1
Rubella	8(1)	..	..	..	8
Salmonella Infection
Sandfly Fever ..	20(7)	37(13)	2(1)	1	2(1)	12(1)	..	..	74
Smallpox
Tetanus	1	..	..	..	..	..	1
Trachoma
Trichinosis
Tuberculosis ..	26(23)	14(10)	11(8)	11(8)	8(5)	3(3)	1	..	74
Typhoid Fever	1(1)	..	..	..	1
Typhus (Flea-, Mite- and Tick-borne)	1(1)	..	..	..	..	..	..	1
Typhus (Louse-borne)
Yellow Fever

* Figures in parentheses are those for the metropolitan area.

officer for venereal disease at that hospital. He practised his specialty in Macquarie Street for many years, but ultimately found that this specialty was shot from under him by the use of sulphonamides and, later, penicillin.

During the war he acted as a consultant in the Royal Australian Air Force with the rank of squadron leader.

For about seventeen years he was the central medical officer to the New South Wales Rugby Football League. Holding this position and also being medical officer to the New South Wales Trotting Association and the Greyhound Association, he became one of the most well-known and popular medical men in New South Wales.

When his specialty disappeared he worked for an insurance company, and whilst holding this and the other positions he became experienced in the treatment of injuries, particularly those sustained by athletes. Professional footballers trusted his judgement and accepted his verdict without hesitation when they were rejected for interstate or international tours. He was a kindly man and was known as "Doc" Finn to thousands of footballers in New South Wales. To his fellow medical men and associates in the University Rugby League Football Club he was known as "Butt".

To his widow and young children our deepest sympathy is extended.

JAMES ROBERT ROBERTSON.

We regret to announce the death of Dr. James Robert Robertson, which occurred on May 30, 1952, at Brisbane, Queensland.

ELIZABETH ELLEN O'KEEFE.

We regret to announce the death of Dr. Elizabeth Ellen O'Keefe, which occurred on May 31, 1952, at St. Kilda, Victoria.

GEORGE REID.

We regret to announce the death of Dr. George Reid, which occurred on June 1, 1952, at North Balwyn, Victoria.

ERIC MENDEL ETTELSON.

We regret to announce the death of Dr. Eric Mendel Ettelson, which occurred on June 4, 1952, at North Caulfield, Victoria.

GAETENO ALAGNA.

We regret to announce the death of Dr. Gaetano Alagna, which occurred at Crookwell, New South Wales, on June 5, 1952.

FREDERICK GUY GRIFFITHS.

We regret to announce the death of Dr. Frederick Guy Griffiths, which occurred at Sydney, New South Wales, on June 6, 1952.

Notice.

THE ROYAL NORTH SHORE HOSPITAL OF SYDNEY.

A MEETING of the Unit of Clinical Investigation of the Royal North Shore Hospital of Sydney will be held on Thursday, June 26, 1952, at 5 p.m. A short communication will be given by Dr. Gilbert Phillips on "Recent Developments in Traumatic Epilepsy", followed by a discussion. The meeting is open to the medical profession generally, and all those interested are welcome to attend.

ROYAL PRINCE ALFRED HOSPITAL.

DR. GILBERT PHILLIPS will give three lectures in the neurology section of the Royal Prince Alfred Hospital seminars on June 27, July 4 and July 11, 1952, at 1.15 p.m.

His subject will be "The Role of the *Formatio Reticularis* in Spasticity, Tremor, Hypokinesia and Sleep". These lectures replace those that were to be given by Dr. McDonald Critchley. The seminars are open to all members of the medical profession.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Laumberg, Maximilian, registered in accordance with the *Medical Practitioners Act, 1938-1950*, Section 17 (1) (c), Flat 6, 23 Orr Street, Bondi, New South Wales.

Diary for the Month.

JUNE 24.—New South Wales Branch, B.M.A.: Ethics Committee.

JUNE 25.—Victorian Branch, B.M.A.: Council Meeting.

JUNE 25.—South Australian Branch, B.M.A.: Annual Meeting.

JUNE 26.—New South Wales Branch, B.M.A.: Branch Meeting.

JUNE 27.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £5 per annum within Australia and the British Commonwealth of Nations, and £6 10s. per annum within America and foreign countries, payable in advance.